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Mobility and Migration

1991 Census Technical Reports



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1991 Census Technical Reports

Mobility and Migration

Reference Products series

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Preface

Through time, the Census of Canada has become the primary source of information about Canadians and how they live. Decisions based on this information affect the social and economic affairs of all Canadians.

Statistics Canada, as the professional agency in charge of producing this information, has the responsibility for informing users of data quality. The agency must describe the concepts and methodology used in collecting and processing the data, as well as any other features that may affect their use or interpretation.

In order to describe the quality of the 1991 Census data, Statistics Canada has prepared the following publications: a census **Dictionary**, which provides concise and easy to understand textual and graphical information pertaining to census concepts; a **Handbook**, which provides an overview of how the census is conducted; and a series of **Technical Reports**, which present in greater detail, information on the quality of data for specific characteristics, such as occupation, as covered in this report.

Information on data quality is important for users. It allows them to assess the usefulness of census data for their purposes as well as the risks involved in basing conclusions or decisions on these data. The 1991 Census was a large and complex undertaking and, while considerable effort was taken to ensure high standards throughout all collection and processing operations, the resulting data are inevitably subject to a certain degree of error.

Information on data quality is also important to Statistics Canada. It is an integral part in the development and maintenance of pertinent and reliable statistical programs.

This publication is a major contribution to achieving these goals. It has been prepared by Y. E. Shin, with the support of staff from three Divisions in Statistics Canada: Demography, Census Operations and Social Survey Methods.

Finally, I would like to express my appreciation to the millions of Canadians who completed their questionnaires on June 4, 1991, as well as to those who assisted Statistics Canada in planning and conducting the census.

Ivan P. Fellegi
Chief Statistician of Canada



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I. Introduction

Every five years a census of population is carried out in Canada. The national census of population is a major project conducted by Statistics Canada to collect, verify and publish data. The national census provides the most comprehensive database on the characteristics of Canadians, their families and their households. The information ranges from age and sex of individuals to their ethnic origin, education, occupation, labour force activity, industry, sources of income, their family and household characteristics. The census is an invaluable source of information that is useful to the various levels of government, to businesses, associations, educational institutions, interest groups, and to the general public. The data can be used in government planning of social and economic programs, assessment of the need for educational and health facilities, and planning by private enterprise.

Information is obtained through a series of questions established after detailed consultation and testing. It is collected by trained enumerators, checked for inconsistencies and errors and forwarded to Revenue Canada Taxation (RCT) regional centres for data entry. The final results are placed on a computer database at Statistics Canada. Data are analyzed, published and disseminated in various forms.

In a massive project such as the census, however, the results are never perfect. Although considerable effort has been made to maintain high standards of quality, errors inevitably occur at various stages of the collection and processing operations. Users must be aware of the nature and scope of any errors that the census data may contain, as well as the risks involved in basing conclusions or decisions on these data.

The **1991 Census Technical Reports** have been designed to inform data users of the potential problems or intricacies of the data. The reports inform users of the conceptual framework and definitions used in the data collection, any unusual circumstances which may influence the data, likely principal sources of error and, where possible, the size of the error.

This product is a specialized analytical tool. It complements and co-ordinates other reference products and assists the more sophisticated user to understand variable details and methodological information on coverage, sampling and weighting.

The purpose of this document is to provide information on various aspects of the data on mobility and migration. It provides a review of the question, concepts and definitions, along with a discussion of limitations inherent in the measurement of one-year and five-year mobility and migration in the censuses of Canada. Some background is provided on the processing of mobility data, from collection through to retrieval. The historical comparability of mobility and migration data from 1961 through to 1991 is examined in terms of conceptual and processing changes. The analysis of the quality of 1991 data focuses mainly on the quality at the national and provincial level. Where possible, the five-year data and the one-year data will be discussed separately.

Data on mobility and migration are considered fairly reliable at the national and provincial level. However, caution is recommended when using data at the small area level. Problems were identified, particularly concerning the reliability of data on out-migration at the census subdivision level.

There were two comprehensive user's guides in previous censuses: one for the 1986 Census entitled *"User's Guide to 1986 Census Data on Mobility"* (Statistics Canada, 1990), and one for the 1976 Census entitled *"A User's Guide to 1976 Census Data on Mobility Status"* (H.A. Puderer, 1980). There was no guide prepared for the 1981 Census. To some extent, therefore, this guide provides some comparisons with 1981 and earlier censuses in an effort to provide continuity to users of both current and previous mobility and migration data. Further information on mobility status data can be obtained by contacting Demography Division staff.

II. Concepts and Definitions

The definitions of census terms, variables and concepts are presented here as they appear in the *1991 Census Dictionary* (Catalogue No. 92-301E). Users should refer to the 1991 Census Dictionary for full definitions and additional remarks related to any concepts and definitions not found in this chapter.

A. Census Variables

While the 1991 Census used fifty-three (53) questions, the *1991 Census Dictionary* (Catalogue No. 92-301E or D) lists well over 200 variables. Obviously, there is not a one-to-one correspondence between questions and variables. Several variables can be produced from one question only, while other variables are derived using responses from several questions.

By the same token, some census variables closely resemble information as it was gathered on the questionnaires, while others are very different. For example, sex has two answer categories, male and female: the categories on the questionnaire correspond exactly to those on the database. Sex is therefore called a **direct** variable.

Derived variables have undergone transformations. For example, "date of birth" was asked on the questionnaire but *age* is the database variable. Sometimes the link between collected information and the database variable is not so straightforward. For example, several questions are used to identify the *unemployed*, yet the word "unemployed" does not appear anywhere on the questionnaire, and its definition is not intuitively obvious.

Census variables are grouped into these categories:

- counts and demographic data;
- ethnic origin and immigration data;
- language;
- aboriginal status;
- mobility and migration;
- schooling;
- religion;
- labour force;
- income;
- families and households;
- housing;
- institutions and other collectives;
- disability.

The potential for creating new census variables is virtually limitless. Some variables can be very conventional and **direct**, while other variables can be **derived** and tailored to user needs.

B. Universes

A “universe” in the census refers to what is counted in a tabulation. The possibilities are:

- population (i.e., persons);
- families;
- households;
- dwellings.

The **Population Universe** includes variables that provide information about individuals. It covers a wide variety of characteristics such as demographic, ethno-cultural, language, mobility, schooling, income and labour force data. A complete list of these variables can be found in the Table of Contents of the **1991 Census Dictionary** (Catalogue No. 92-301E). Some variables within this universe are collected for the entire population of Canada; others are collected for a sample of the population only.

The primary objective of the census is to provide accurate coverage of the entire population of Canada at various geographic levels. The 1991 Census provided counts for:

- Canadian citizens and landed immigrants with a usual place of residence in Canada;
- Canadian citizens and landed immigrants who are abroad, either on a military base or attached to a diplomatic mission;
- Canadian citizens and landed immigrants at sea or in port aboard merchant vessels under Canadian registry;
- non-permanent residents (persons who hold student or employment authorizations, Minister's permits or who are refugee claimants);
- all non-Canadian born dependents of persons claiming refugee status, or of persons holding student authorizations, employment authorizations or Minister's permits.

“Families” are groups within a household. Within the **Family Universe**, two general categories are identified: **census families** and **economic families**.

- A census family refers to a now-married couple (with or without never-married sons and/or daughters of either or both spouses), a couple living common-law (again with or without never-married sons and/or daughters of either or both partners), or a lone parent of any marital status, with at least one never-married son or daughter living in the same dwelling.
- An economic family refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law union or adoption. For example, a brother and a sister living together, or a mother and her separated daughter, would constitute an economic family, but not a census family.

The **Household Universe** is composed of subuniverses and variables which pertain to a person or a group of persons (other than temporary or foreign residents) who occupy a dwelling. Examples of household universes are private households, collective households, households outside Canada, and farm and non-farm dwellings.

The **Dwelling Universe** is composed of subuniverses (collective and private) and variables pertaining to characteristics of dwellings in Canada. Dwellings are distinct from households. Dwelling characteristics refer to physical attributes of a set of living quarters, whereas household characteristics pertain to the person or group of persons (other than foreign and/or temporary residents) who occupy a dwelling.

C. Census Geography

Statistics Canada uses a very accurate and detailed geographic structure that makes it possible to obtain information for many different geographical units, known as geographic areas. Data from the 1991 Census are available for numerous standard geographic areas, as well as non-standard or user-defined areas.

1. Census Boundaries

In order to take a census for a country as large as Canada, smaller geographic boundaries must be established to facilitate enumeration. The basic boundaries are those of the provinces (PROVs), the federal electoral districts (FEDs) and, finally, those of a smaller unit called the enumeration area (EA).

2. Standard Geographic Areas

Census data are disseminated for a number of standard geographic areas. These areas are of two (2) types: legislative/administrative and statistical.

- (a) Legislative/administrative areas are defined, with a few exceptions, by Canadian federal and provincial statutes. These include:

Geographic Area	Total Number
• provinces and territories;	12
• federal electoral districts (FEDs);	295
• census divisions (CDs);	290
• census subdivisions (CSDs);	6,006
• subprovincial regions (SPRs).	68

- (b) Statistical areas are defined by Statistics Canada as part of the spatial frame used to collect and disseminate census data. These include:

Geographic Area	Total Number
• agricultural regions;	76
• census consolidated subdivisions (CCSs);	2,630
• census metropolitan areas (CMAs);	25
• census agglomerations (CAs);	115
• primary census metropolitan areas (PCMAs);	12
• primary census agglomerations (PCAs);	21
• census tracts (CTs);	4,068
• provincial census tracts (PCTs);	1,815
• urban areas (UAs)/rural areas;	893
• CMA/CA parts;	N/A

- | | |
|----------------------------|--------|
| • CMA/CA components; | N/A |
| • enumeration areas (EAs). | 45,995 |

Other geographic units of a quasi-standard nature are the **unincorporated place (UP)**, **township**, **range** and **meridian** and **postal code**.

3. User-defined Areas

Census data can also be produced for areas other than the standard geographic areas, that is for user-defined areas. The latter are of two (2) types: aggregations of standard geographic areas and custom **query areas**.

An in-depth look at terms related to the geography of the 1991 Census is contained in the geography section of the *1991 Census Dictionary*. This section's definitions describe, more extensively, concepts related to geographic areas and census cartography.

D. Mobility and Migration

This user's guide refers to the mobility questions on "place of residence 5 years ago" (asked in the 1991 Census as well as in previous censuses of Canada) and on "place of residence 1 year ago" (asked for the first time in the 1991 Census). The version of the question asked in the 1961, 1971, 1976, 1981, 1986 and 1991 Census questionnaires is presented in Appendix A. This question has always been asked on a sample basis, with a sample of 33.3% of households for 1971 and 1976, and of 20% of households for the other years 1961, 1981, 1986 and 1991. From 1971 on, the question appears on the long form, or 2B questionnaire.

Starting with the 1971 Census, self-enumeration was introduced. In 1961, census data were collected using canvassers - that is, answers were recorded by the enumerator in personal interviews.¹ For self-enumeration, respondents were provided with guidelines for answering the questions. Guidelines for answering the questions on mobility as given in "Instruction Booklets" for 1971 and 1976, and in "Census Guides" for 1981, 1986 and 1991, are also provided in Appendix A.

In terms of both concept and format, the question has varied little over these past censuses. Differences are due mainly to wording and instruction changes, with the exception of the 1991 Census. In 1991, the question on the place of residence 5 years ago was split into two: one filter question which distinguished movers from non-movers, and a detailed question on the place of residence 5 years ago. In 1991, a question on the place of residence 1 year ago was introduced for the first time in the history of the Canadian census. Additional questions were asked in two censuses: in 1961, a question was asked on whether or not one's residence 5 years ago was on a farm; and, in 1971, a second question was asked on the number of moves made during the 5-year period.

Prior to 1961, mobility data were collected in the 1941 Census of Canada and the 1946 Census of the Prairie Provinces. In the latter case, the data related to a 5-year migration interval, whereas in 1941, the data were based on measures of continuous and last permanent residence.

A discussion of the historical comparability of mobility data is provided in Section VII.

The following presents the concepts and definitions of mobility and migration and the relationship between the 1991 Census mobility status question and the mobility status conceptual framework.

¹ In 1961, information for all questions, except the income question, were reported by canvassers. In the case of income, respondents filled out the question later on their own. The mobility question, as well as some other questions, was included on the same questionnaire as income, i.e., Form 4.

1. Mobility Status – Place of Residence 5 Years Ago

“Mobility status – place of residence 5 years ago” refers to the relationship between a person’s usual place of residence on Census Day and his/her usual place of residence five years earlier. A person is classified as a **non-mover** if no difference exists; otherwise, a person is classed as a **mover** and this categorization is called Mobility Status (5 Years Ago). Within the category **movers**, a further distinction is made between **non-migrants** and **migrants**; this difference is called migration status. Migrants are classified as either internal or external migrants.

The 1991 Census of population residential mobility question (5-year interval) had two parts. The first part was a filter question where non-movers and movers were differentiated, while the second part consisted of check-in boxes and “write-in” spaces for movers. The filter question asked the respondents to check whether their address at the time of the census was the same as or different from the address five years earlier.

A response to the self-coded part of the question for those who checked “different address” was made by checking the circle opposite the appropriate reply. Provision was made for three possible replies for movers:

- (i) Lived in the same city, town, village, township, municipality or Indian reserve.
- (ii) Lived in a different city, town, village, township, other municipality or Indian reserve in Canada.
- (iii) Lived outside Canada.

On the basis of the self-coded responses, the respondents were classified as (i) non-migrants/migrants, (ii) external migrants, and (iii) internal migrants.

A response to the write-in part of the question was required when the self-coded response was “Lived in a different city, town, village, township, municipality or Indian reserve” or “Lived outside Canada”. Via the write-in entry, respondents were asked to identify their place of residence in Canada five years ago, giving the city, town, village, township, municipality, or Indian reserve, the county and the province or territory, and to print the name of the country.

The write-in responses provided by internal migrants were used to provide origin-destination data for census subdivisions (CSDs) or aggregations of CSDs.

Based on the above response categories, the mobility status definitions are as follows:

Non-movers are persons who, on Census Day, were living at the same address they occupied five years earlier.

Movers are persons who, on Census Day, were living at a different address than the one at which they resided five years earlier.

Non-migrants are movers who, on Census Day, were living at a different address but in the **same** census subdivision (CSD) that they occupied five years earlier.

Migrants are movers who, on Census Day, were residing in a **different** CSD in Canada five years earlier (**internal migrants**) or who were living **outside Canada** five years earlier (**external migrants**).

For persons 5 to 14 years of age, mobility information was imputed on the basis of responses given by some other family members, because the question on the place of residence was asked only to persons 15 years and over. For non-family members (not resident in a collective dwelling), imputation was made on the basis of information reported by Person 1 in that household.

With respect to **external migration**, **immigrants** – persons who were residing outside Canada five years earlier, but in Canada on Census Day – are counted. This concept is not to be confused with that of “landed immigrants”; see **Immigration: Year of Immigration** in the **1991 Census Dictionary**. When migration data on external migrants by country of residence five years ago are tabulated, the reported country reflects its current geographic boundaries. (**Emigrants** – persons residing in Canada five years ago but not on Census Day 1991 – are not counted.)

With respect to **internal migration**, different types of migration are derived based on various aggregations of CSDs (e.g., to CDs and CMAs). Information on **in-migration**, **out-migration**, **net internal migration**, **intraprovincial migration**, **interprovincial migration**, **migration streams** and **origin-destination matrices** can be produced from the database.

In-migration is defined as a movement of persons into a CSD (or CSD aggregation) from elsewhere in Canada, relative to the five-year interval. Persons who made such a move are called **in-migrants**.

Out-migration is defined as a movement of persons out of a CSD (or CSD aggregation) to elsewhere in Canada, relative to the five-year interval. Persons who made such a move are called **out-migrants**.

Net internal migration refers to the number of in-migrants into a CSD (or CSD aggregation) minus the number of out-migrants from the same CSD (or CSD aggregation) relative to the five-year migration interval.

Intraprovincial migration is defined as a movement of persons to or from a CSD (or CSD aggregation) within the same province. Persons who made such a move are called **intraprovincial migrants**.

Interprovincial migration refers to movements from one province or territory to another which involve a change of residence. An interprovincial migrant is a person who, in the five-year migration interval, takes up residence in another province or territory. Such a person is an out-migrant with reference to the province or territory of origin, and an in-migrant with reference to the province or territory of destination.

Net interprovincial migration refers to the number of in-migrants into a province or territory minus the number of out-migrants from the same area relative to the five-year interval.

Migration stream refers to a body of migrants having a common CSD (or CSD aggregation) of origin and a common CSD (or CSD aggregation) of destination.

Origin-destination matrix refers to data on migrants, cross-classified by area of origin (CSD or CSD aggregation) and area of destination (CSD or CSD aggregation) to form a matrix of streams, or a set of pairs of streams, each pair representing movement in opposite directions.

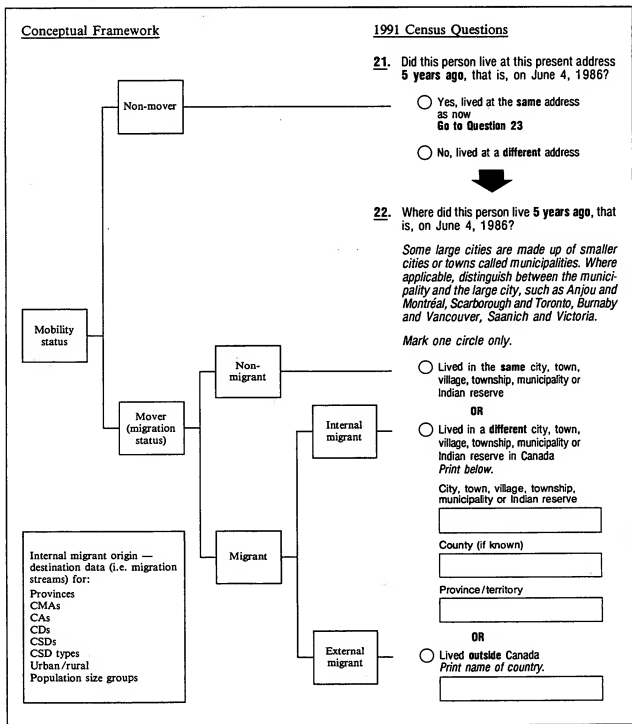
In tabulations of usual place of residence 5 years ago by current place of residence, all geographic areas reflect their 1991 boundaries, even when referred to as places of residence in 1986. This applies to all boundary changes between censuses (e.g., census metropolitan areas, census divisions, census subdivisions).

The concept of "migrants" is defined at the CSD level. For geographic levels below the CSD, such as enumeration areas (EAs) and census tracts (CTs), the distinction between the migrant and non-migrant population refers to the corresponding CSD of the EA or CT. For example, migrants of a CT are those persons who moved from a different CSD, while non-migrants are those who moved within the same CSD - they moved either between different CTs or within the same CT. (For geographic hierarchy and definitions of the terms used in 1991, see Appendix C).

Mobility status is reported for the population 5 years of age and over residing in Canada, excluding persons in collective households.

The reader is directed to Figure 1, where the relationship between the 1991 Census of population mobility status question and the mobility status conceptual framework is illustrated.

Figure 1. Relationship Between the Mobility Status – Place of Residence 5 Years Ago Conceptual Framework and the 1991 Census Question on Place of Residence 5 Years Ago



2. Mobility Status - Place of Residence 1 Year Ago

"Mobility status - Place of Residence 1 Year Ago" refers to the relationship between a person's usual place of residence on Census Day and his or her usual place of residence one year earlier. A person is classified as a **non-mover** if no difference exists; otherwise, a person is classed as a **mover** and this categorization is called Mobility Status (1 Year Ago). Within the category **movers**, a further distinction is made between **intraprovincial movers**, **interprovincial migrants** and **external migrants**.

The 1991 Census of population residential mobility question (1-year interval) had two parts. The first part was "self-coded", while the second part required a "write-in" response.

A response to the self-coded part of the question was made by checking the circle opposite the appropriate reply. Provision was made for four possible replies:

- (i) Lived at the same address as now.
- (ii) Lived in the same province/territory, but at a different address.
- (iii) Lived in a different province/territory in Canada.
- (iv) Lived outside Canada.

On the basis of the self-coded responses, the respondents were classified as (i) non-movers/movers, (ii) intraprovincial movers, (iii) interprovincial migrants and (iv) external migrants.

A response to the write-in part of the question was required when the self-coded response was "Lived in a different province/territory" or "Lived outside Canada". Via the write-in entry, respondents were asked to identify their province/territory of residence in Canada one year ago or their country of residence.

The write-in responses provided by internal migrants were used to provide origin-destination data at the province/territory level.

Based on the above response categories, the mobility status definitions are as follows:

Non-movers are persons who, on Census Day, were living at the same address they occupied one year earlier.

Movers are persons who, on Census Day, were living at a different address than the one at which they resided one year earlier.

Intraprovincial movers are movers who, on Census Day, were living at a different address **but** in the same province/territory that they occupied one year earlier.

Interprovincial migrants are movers who, on Census Day, were living in a different province/territory one year earlier.

External migrants are movers who, on Census Day, were living outside Canada one year earlier.

These mobility status definitions relate to a new mobility variable for 1991, based on place of residence one year ago. Like the **Mobility Status - Place of Residence 5 Years Ago** variable, the one-year-ago variable determines whether or not a person is a mover; that is whether or not the person lived at a different address one year earlier. Unlike the **Mobility Status - Place of Residence 5 Years Ago** variable, place of residence one year ago is restricted to the provincial level. Therefore, with the one-year-ago variable, it is not possible to determine if a mover is a migrant or non-migrant in terms of whether or not, on Census Day, the mover lived in a different census subdivision (CSD) five years earlier. The only differentiation that can be made between movers is whether or not, on Census Day, the mover lived in a different province one year earlier. Thus, one-year-ago movers can be classified as either "intraprovincial movers" or "interprovincial migrants".

For persons 1 to 14 years of age, mobility information was imputed on the basis of responses given by some other family members. For non-family members (not resident in a collective dwelling), imputation was made on the basis of information reported by Person 1 in that household.

With respect to **external migration**, **immigrants** – persons who were residing outside Canada one year earlier but in Canada on Census Day – are counted. This concept is not to be confused with that of “landed immigrants”; see **Immigration: Year of Immigration** in the **1991 Census Dictionary**. When migration data on external migrants by country of residence one year ago are tabulated, the reported country reflects its current geographic boundaries. **Emigrants** – persons residing in Canada one year ago but not on Census Day 1991 – are not counted.

With respect to **internal migration**, users should note that province/territory is the migration-defining unit for the one-year migration interval. Information on **in-migration**, **out-migration**, **net internal migration**, **migration streams** and **origin-destination matrices** can be produced from the database.

In-migration is defined as a movement of persons into a province or territory from elsewhere in Canada, relative to the one-year migration interval. Persons who made such a move are called **in-migrants**.

Out-migration is defined as a movement of persons out of a province or territory to elsewhere in Canada, relative to the one-year migration interval. Persons who made such a move are called **out-migrants**.

Net internal migration refers to the number of in-migrants into a province or territory minus the number of out-migrants from the same province/territory relative to the one-year migration interval.

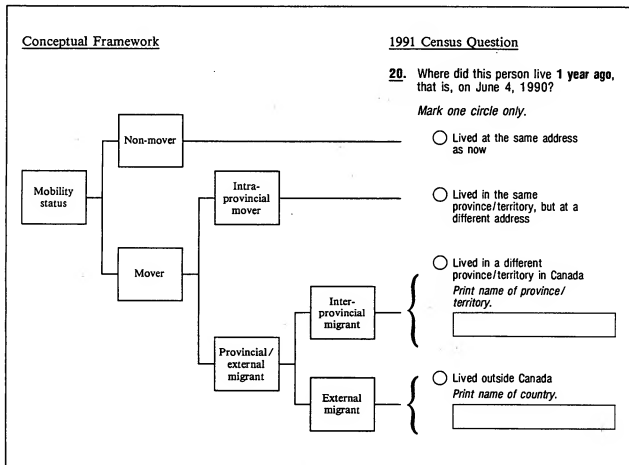
Migration stream refers to a body of migrants having a common province or territory of origin and a common province or territory of destination.

Origin-destination matrix refers to data on migrants, cross-classified by area of origin (province/territory) and area of destination (province/territory) to form a matrix of streams, or a set of pairs of streams, each pair representing movement in opposite directions.

Mobility status is reported for the population 1 year of age and over residing in Canada, excluding persons in collective households.

The reader is directed to Figure 2, where the relationship between the 1991 Census of population mobility status question and the mobility status conceptual framework is illustrated.

Figure 2. Relationship Between the Mobility Status - Place of Residence 1 Year Ago Conceptual Framework and the 1991 Census Question on Place of Residence 1 Year Ago



E. Limitations of Mobility Status Concepts and Measurements

1. Space and Time Dimensions

In order to provide a measure of migration, a conceptual framework and operational definitions must be established. No single approach is correct and there are advantages and disadvantages in any approach. Census mobility status rests on the concepts of "change of residence" and "inter-community movement" associated with movers and migrants, respectively. A change in social milieu (i.e., a change in community ties and life conditions) is used as the basis for distinguishing between migrating and non-migrating moves. Inter-community movements are migratory, while intra-community movements are non-migratory.

Change of residence is represented as "living in a different dwelling" (five years ago) and "inter-community movement" is represented as "living in a different CSD" (five years ago). The CSD was chosen as the basis for defining migration status, since it provides a reasonable measurement of inter-community movement.

With respect to the time dimension, census mobility status is based on a comparison of residence at two fixed points in time. An interval of fixed length, in this case 5 years, is used. (Indefinite intervals, such as those measured by questions on last previous place of residence or lifetime mobility, lack a specific time reference.) The 5-year interval is generally acknowledged as a good length of time since it coincides with the intercensal period, thereby providing a measure of migration as a component of growth. With longer periods, both respondent recall and response would probably decline. (For further discussion, the user is referred to United Nations Manual VI, *Methods of Measuring Internal Migration*, and as well to the *1976 User's Guide*).

There are some limitations associated with the use of the CSD as a migration defining unit and of the five-year migration interval that users should be aware of.

2. Limitations Associated with the Use of the CSD as the Migration Defining Unit

A number of such limitations were enumerated in the 1976 User's Guide. The following is a brief summary of these problems.

Movement between CSDs is intended to serve as a proxy for "inter-community movement". However, there will be a proportion of short inter-CSD moves which may involve less of a change in the social milieu of the mover, compared to some lengthy intra-CSD moves. Of course, this problem is not unique to the use of CSDs, since any choice of community boundaries will lead to similar problems.

A second problem is the variation in CSDs by size, shape and length of border. This poses limitations in the comparative analysis of migration within Canada, as well as in the comparison of Canadian migration data with those of other countries. To some extent, the volume of migration is a function of the size of the CSD.

An additional consideration in relation to the problem of variation in CSD size is the variation in the number of CSDs, say within regions/provinces and over time. Volume of migration is also a function of the number of CSDs, and hence is a limitation that should be considered in any comparative analysis among regions, and across censuses. Historical analysis is also affected by variation in CSD size and border. Discussion on the historical comparability of migration data in relation to CSD variation is presented in Section VII.

A third major limitation with the use of the CSD as a migration defining unit is respondent error. The bias usually occurs in CMAs when respondents tend to identify the CMA itself as the previous place of residence instead of the actual CSD within the CMA. For this reason, caution should be used in any detailed analysis of intra-CMA/CA migration patterns. A detailed discussion of small area (CSD level) data quality problems is provided in Section VI. As will be discussed in Section IV, this type of respondent error has been manually corrected in such a way that the main city codes found in each CMA were changed to surrounding city codes when write-in responses included names of both cities.

3. Limitations Associated with the Use of the Five-year and One-year Migration Intervals

The limitations of a five-year reference period have been well documented (for details see Puderer, pp. 33-35). As a consequence of the five-year period, certain moves are precluded.

Multiple moves are not captured; only the net effect of these moves is. This can affect migration data in a number of ways. Return moves and migrants are not counted: those who moved during the five-year period but returned by its end to either their previous dwelling or CSD of residence are classified as non-movers or non-migrants respectively. A non-migrant mover who moved from Ottawa to Toronto and back to Ottawa (but to a different residence) is indistinguishable from the non-migrant mover who changed dwellings within the Ottawa CSD.

Similarly, origin-destination flows can be affected by multiple moves. The person who moved from Quebec to Ontario to British Columbia is not discernible from the one who moved from Quebec directly to British Columbia over the five-year period.

Another major consideration is that only the moves and migrations of those who are still alive at the end of the five-year period are counted. Moves of those who died before enumeration are not counted.

Those under 5 years of age are precluded from the mobility status universe and, of course, their moves are not counted.

Finally, users should remember that the characteristics of movers and migrants are measured at the time of enumeration, not at the time of moving. Thus, in most analyses of mobility status by various demographic, social and economic characteristics, this limitation should be considered.

The types of limitations associated with the use of the data for a one-year reference period may be almost the same as those of a five-year period. The degree of the limitations may be slightly less. For example, a person who moved from Quebec to Ontario to British Columbia can be captured as a migrant from Quebec to Ontario when the person stayed in Ontario only one year; more migrants will have remained to be captured if the interval is one year than if it is five years; there is a greater chance of a return migrant being captured when the interval is one year because the migrant may not have returned to the original place.

III. Data Collection and Coverage

For the 1991 Census, information was collected from more than 11 million dwellings, both in Canada and abroad. The data collection process consists of the drop-off and retrieval of approximately 11,500,000 questionnaires. These questionnaires are then edited to ensure they have been properly completed by all Canadians across the country. This phase employed approximately forty thousand (40,000) people in a variety of tasks, from mapping to post-censal activities.

Two **collection methods** were used for the 1991 Census: **self-enumeration** and **canvasser enumeration**. In self-enumeration areas, a questionnaire (Form 2A or Form 2B) was dropped off at each household before Census Day (June 4th). A member of the household was to complete the questionnaire on Census Day. Questionnaires were mailed back in pre-addressed envelopes. In 1991, less than 2% of households were enumerated by canvassers: census representatives completed a long form questionnaire (Form 2D) for these households by interview. This method was used to enumerate each household in remote or northern areas and on Indian reserves, where irregular mail service makes mail-back impractical. Some of the remote areas were enumerated as early as March 1991. Data was collected on *every Canadian citizen, landed immigrant and non-permanent resident alive at midnight between June 3 and June 4, 1991.*

The two main types of accepted **enumeration approaches** used by census takers are the “**de jure**” approach and “**de facto**” approach. The “**de jure**” approach assigns the person to the dwelling in which he/she usually resides. The “**de facto**” approach assigns the person to the dwelling in which he/she is staying at the time of enumeration. In Canada, the “**modified de jure**” approach is used. It allows a subsequent matching process to determine whether or not a person enumerated in one dwelling as a temporary resident was also identified as a usual resident at his/her stated usual place of residence. This approach recognizes, and compensates for the potential failure of, a straight “**de jure**” approach to enumerate persons away from their usual place of residence on census night.

The primary components, documents and geographical unit used for data collection and coverage are:

- Visitation Record (VR) (Form 1)

A document used by census representatives to list the household numbers and the number of persons per household, including temporary residents, in all enumeration areas. The VR lists every private and collective dwelling (occupied and unoccupied), as well as every agricultural holding in an enumeration area. The VR also provides control totals to help ensure that all dwellings and persons were enumerated.

- Census of Population Questionnaires

Seven questionnaires have been designed for the collection of data. The 1991 Census questionnaires include:

Collective Dwelling Record	(Form 1A);
Short Questionnaire	(Form 2A);
Long Questionnaire	(Form 2B);
Overseas Population Form	(Form 2C);
Long Canvasser Questionnaire	(Form 2D);
Individual Census Questionnaire	(Form 3);
Soup Kitchen Questionnaire	(Form 3B).

- Enumeration Area (EA)

An EA is an area canvassed by a Census Representative. It is the smallest geographical unit for which census data are available. The number of dwellings contained in an EA varies from 375 (maximum) in large urban areas to 125 (minimum) in rural areas.

Please refer to the **Long Questionnaire (Form 2B)** for questions asked in the 1991 Census of Canada.

A. Coverage Improvement and Measurement

In 1991, a number of initiatives were taken to improve coverage. These included:

- using paid advertising to inform Canadians on when and how “to count themselves in”;
- creating an address register from other sources of information and using this list to check if any dwellings were missed;
- establishing special procedures to count homeless people through soup kitchens;
- establishing special procedures to count the population on Indian reserves;
- creating a respondent-friendly questionnaire;
- establishing the Public Communications Program and a multilingual Telephone Assistance Service.

Since one hundred percent (100%) coverage is virtually impossible in such a large survey, however, a number of checks are performed on the collection of data. These studies measure the extent of coverage errors that occur when dwellings or individuals are missed, incorrectly included, or double-counted. Some examples of these checks are the **Vacancy Check**, **Temporary Residents Study**, **Reverse Record Check**, and the **Overcoverage Study**. These studies will be discussed in more detail in the following chapters on Data Assimilation (Section IV) and Data Evaluation (Section VI).

B. Mobility Data Coverage

Five-year mobility data are reported for the population 5 years and over, excluding all persons in the collective households and those temporarily residing overseas. However, data from the mobility question on the 1991 questionnaire were only collected for persons 15 years of age and over who were residing in Canada at the time of the census. For persons 5-14 years of age, five-year interval mobility data were imputed on the basis of information reported for other family members. Similarly, for persons 1-14 years of age, one-year interval mobility data were imputed.

The 1991 Census mobility question was included on the 2B, or long, questionnaire which was used to enumerate one in five households in Canada.

C. Field Processing of Mobility Question

If certain information was missing or unclear in the response to the mobility question, it was mandatory that enumerators contact respondents. This follow-up was done first by telephone. If enumerators could not obtain the required information, a field follow-up was done. (Not all questions required mandatory follow-up, but if more than 6 non-mandatory questions failed edit, a follow-up was required).

In the case of mobility, the question could fail edit, and hence require follow-up, for the following reasons: non-response; multiple response – more than one answer category checked off and no write-in; invalid response (e.g., illegible write-in); and, incomplete or partial response. In the latter situation, a written response for “different city, town, village, etc.” was considered to be incomplete if the name of either the municipality or province was not provided.

The Edit Sample Study of the 1991 Census indicated that, prior to follow-up: the rate of non-response for 5-year mobility was 4.4% for the filter question and 3.0% for the subsequent mobility question; the multiple response rate was 1.7% for the filter question and 6.0% for the mobility question; the partial response rate was 1.8% for the mobility question. Follow-up reduced non-response rates from 4.4% to 1.6% for the filter question and from 3.0% to 0.5% for the mobility question. No direct measure of "partials" (e.g., answer category checked, but no write-in) was available.

The similar rates before follow-up for 1-year mobility data were 4.0%, 0.7% and 0.1% for non-response, multiple response and partial response, respectively. The follow-up edit reduced the non-response rate from 4.0% to 1.2%.

IV. Data Assimilation

Data assimilation is the processing phase during which data from the census questionnaires are edited, coded and captured. The process includes the transformation of the questionnaire responses into machine-readable form.

The four main components of data assimilation are:

- Regional Office Processing
- Direct Data Entry
- Head Office Processing
- Automated Coding

A. Regional Office Processing (ROP)

At this stage, ROP staff will ensure that information appearing on the questionnaires is suitable for key entry into the computer. This operation employs approximately 2,000 people, and is conducted in Revenue Canada - Taxation (RCT) regional processing centres in St. John's, Jonquière, Shawinigan, Sudbury, Winnipeg and Surrey. In Ottawa, it is conducted in the Statistics Canada head office. For the 1991 Census, the operation took place during the period between July and November of 1991.

ROP operations consisted of the following:

(a) Receipt and Document Preparation

When completed questionnaires reached the regional processing centres, they were logged, counted and prepared for key entry. Preparation included consistency checks between the questionnaires and the Visitation Record - making sure, for example, that the number of household members on both documents matched. Legibility checks ensured that the documents were suitable for computer data entry. Finally, all written answers on household relationships (Question 2) were converted to numerical codes.

(b) Reverse Record Check

A sample of persons was selected from the 1986 Census records and external sources, and 1991 documents were searched for these same persons. If a person was found, 1991 characteristics were noted and sent to the head office. For those not found, further tracing and searching determined if they had been enumerated elsewhere in Canada or missed altogether. The results of these searches were coded and captured and the file was turned over to the Data Quality Project for weighting and production of undercoverage estimates.

(c) Economic Coding

Written responses for some labour market questions on the long census forms were converted into numeric codes suitable for direct data entry. Three tasks were involved:

- editing to determine if the respondent had worked at any time during the period of January 1, 1990, to June 4, 1991;
- converting the industry, occupation and place of work data to numeric codes;
- editing the class of worker question.

Supervisors and coding consultants resolved any discrepancies in coding before the questionnaires for an enumeration area (EA) proceeded to the next stage. Sometimes other sources, city directories and subject-matter personnel for example, were consulted.

(d) Processing

Questionnaires were transferred in work units for direct data entry at Revenue Canada - Taxation regional processing centres: from there, after keying, they were sent to Statistics Canada in Ottawa.

B. Direct Data Entry (DDE)

The data entry activity was completed on behalf of Statistics Canada by Revenue Canada - Taxation (RCT). Questionnaire data were key-entered at seven (7) RCT regional centres, transmitted to RCT Headquarters in Ottawa, and stored on tape cartridges. This operation employed approximately 1,500 people sworn to secrecy under the Statistics Act.

All questionnaire responses, including write-in responses (text) for mobility, were keyed into a computer.

C. Head Office Processing (HOP)

Head office processing is a combination of automated and manual processing designed to carry out structural edits on the census data and to process special enumeration returns. Included are returns for Canadians overseas, temporary residents and merchant and navy ships personnel. HOP also processes coverage study returns such as for the **Reverse Record Check (RRC)**, **Vacancy Check (VC)**, and **Overcoverage Study (OC)**. In addition, HOP is responsible for the preliminary and final population and dwelling counts and for the microfilming of census questionnaires for archival purposes. This operation employs approximately 150 people and is conducted at the Statistics Canada head office in Ottawa.

Head office processing consisted of four major activities, performed in three phases:

- **DA I - Receipt, Registration and Storage**

Visitation records and questionnaires for each enumeration area were received, registered and stored at the head office. Tapes containing respondent data were copied and loaded onto the HOP database.

- **DA II - Data Analysis**

Automated structural edits were carried out at the enumeration area, household and person levels, and inconsistencies, such as person count conflicts and household number conflicts, were resolved manually.

- **DA III - Special Processing**

Special enumeration returns from Canadians living outside Canada, temporary residents and persons aboard merchant, naval and coast-guard vessels were adjusted to include them. In addition, coverage study returns for checking vacant dwellings, under- and over-coverage were processed, and adjustments were done to the data based on the results of the Vacancy Check and the Temporary Resident Study.

D. Automated Coding (AC)

Automated coding was introduced into the census processing cycle for 1991, replacing costly and time-consuming manual coding operations. Most socio-cultural questions with write-in responses, such as the questions on mother tongue, home language, knowledge of other languages, registered Indian status, place of birth, ethnic origin, major field of study, and religion, and the two mobility questions (place of residence 1 year ago and place of residence 5 years ago) were autocoded.

Responses were coded using the ACTR (Automated Coding by Text Recognition) software. This software matched the responses against comprehensive reference files prepared by subject-matter experts. Any responses that could not be coded by the system were subjected to a computer-assisted manual resolution process. (For more information on this project, including its Quality Control aspects, see the "1991 Census Automated Coding Evaluation Report",

Statistics Canada, 1993, Internal Document.) The rest of this section will deal only with the coding of the four different Mobility responses:

- (i) "Inside Canada 5 years ago";
- (ii) "Outside Canada 5 years ago";
- (iii) "Inside Canada 1 year ago";
- (iv) "Outside Canada 1 year ago".

Although four types of mobility responses were processed, two distinct methodologies were employed. The responses for "Inside Canada 5 years ago" were coded with unique criteria and parameters (see "Municipality Coding" below). The other three types of responses (i.e., "Inside Canada 1 year ago", "Outside Canada 1 year ago", and "Outside Canada 5 years ago") used common reference materials and procedures, although each was coded independently. (See "Province/Country Coding" below.) As Table 1 indicates, 79% and 88% of the total number of write-ins on the place of residence 5 years ago and 1 year ago, respectively, were coded by the system. Error rates for the system coding were 3.4% and 0.2%, respectively. After the automated coding, certain unassigned codes and incorrectly assigned codes were modified manually, as described in the following section. During this stage of manual coding and fixes, an attempt was made to resolve the problems identified from the detailed analysis of the 1986 Census, especially problems for small areas. (See the 1986 User's Guide, "Small Area Data Quality" section, pages 46-52.)

Table 1. Match Rate and Error Rate of Automated Coding of Mobility Variable by Type: Canada, 1991 Census

Type of Data	Total Number of Responses	Number of System-coded Responses	Number of Manually Coded Responses	System Match Rate (%)	Error Rates Before Fixes (%)		
					Total	System	Manual
One-year Data	144,902	127,310	17,592	87.9	0.3	0.2	1.3
Five-year Data	1,202,854	944,876	257,978	78.6	3.7	3.4	4.6
Total	1,347,756	1,072,186	275,570	79.6	3.3	3.0	4.4

Source: 1991 Census of Canada, unpublished tabulation.

One unanticipated response pattern that was common to all Mobility responses was exhibited by the responses for underaged persons (i.e., less than 1 for 1-year interval data, or less than 5 for 5-year interval data). Table 2 presents the number of such responses by type. Instructions on the questionnaire clearly indicate that responses are only necessary for respondents aged 15 and over. During dataset production, reference files and procedures were modified to assign a "dummy" code to these responses. The Edit & Imputation programs and procedures were also modified to ensure verification with data for age.

Table 2. Number of Responses for Underaged Persons by Question Type: Canada, 1991 Census

Question Type	Number of Responses (Unweighted)
Inside Canada 5 Years Ago	2,422
Outside Canada 5 Years Ago	1,703
Inside Canada 1 Year Ago	2,648
Outside Canada 1 Year Ago	526

Source: 1991 Census of Canada, unpublished tabulations.

After production coding was completed, all responses were subjected to a thorough review, in order to detect and correct any systematic errors in code assignment that could have been missed during Quality Control. This activity concentrated on response/code combinations with a frequency greater than 3. (Time constraints prevented analysis of less frequently occurring response/code combinations.) Subject-matter experts conducted independent analysis of hard copy reports, and prepared a file of transaction records, which were then used to apply global changes. In other words, the application of one transaction record would result in a new code for all occurrences of the response/code combination. Table 3 shows the number of code revisions for each type of Mobility response.

Table 3. Number of Code Corrections by Question Type: Canada, 1991 Census

Question Type	Number of Code Corrections
Inside Canada 5 Years Ago	29,147
Outside Canada 5 Years Ago	370
Inside Canada 1 Year Ago	339
Outside Canada 1 Year Ago	243

Source: 1991 Census of Canada, unpublished tabulation.

Province/Country Coding

This group was coded using the reference file prepared by the subject-matter experts for "Place of Birth" census data. This file was expanded to include information explicit to the Mobility responses. Only direct system matches were accepted. All non-matched responses were subjected to computer-assisted manual resolution.

As all three types of responses were collected for the first time in 1991, several unanticipated response patterns were encountered, such as the recording of "Outside Canada" responses in the box for "Inside Canada", and responses containing extra information (e.g., "Toronto Ontario").

Municipality Coding

In the past, manual coding of sub-provincial responses has been identified as problematic, due to the nature of the responses and of the manual coding process. (More information on this was reported (1989) by J. A. Norland in "Evaluation of the Mobility Data from the 1986 Census".) The major recommendation of this report resulted in extensive research and testing activity, culminating in the approval of the use of automated coding in order to improve data quality.

The reference file used was prepared by staff from the Demography Division, using an input file from the Geography Division. This input file contained names of municipalities, neighbourhoods, and unincorporated places, and the corresponding current (i.e., 1991) Standard Geographical Classification (SGC), a 7-digit numeric code unique to each municipality in Canada. Many issues were identified during the research and testing phase, and resolution strategies were implemented for production. Other issues were identified during production, requiring modifications to the reference file and/or manual resolution procedures. These issues included:

- duplicate place names;
- over-reporting of the main city in CMAs;
- non-geographic/extraneous responses;
- parsing strategy;
- establishing system parameters;
- establishing procedures for computer-assisted manual resolution;
- identification of supplementary reference material;

- commonly used abbreviations and spelling errors;
- partial responses (geographic);
- responses for "Outside Canada" recorded in wrong box.

Duplicate Place Names

This is probably the most serious complicating factor for sub-provincial level coding, with 4,296 place names occurring 18,083 times, based on a character-by-character match, nation-wide. Three steps were employed to deal with these responses in 1991:

- identification of a "preferred" code, and the conditions when it should be used;
- incorporation into the reference file of distinguishing partial responses (e.g., "Kingston City" vs. "Kingston Township");
- creation and incorporation into the reference file of "pseudo-codes", which were re-assigned during Edit & Imputation.

Table 4 shows the number of pseudo-codes by number of splits (from two to seven). Four place names had to be split seven ways, because there were seven places with the same place name.

Table 4. Number of Pseudo-codes by Number of Splits: Canada, 1991 Census

Number of Breakdown	Number of Pseudo-codes
Two-way	772
Three-way	246
Four-way	83
Five-way	30
Six-way	9
Seven-way	4
Total	1,144

Source: 1991 Census of Canada, unpublished tabulation.

Over-reporting of the Main City in CMAs

This is a respondent problem, which persists despite explicit examples being provided on the questionnaire. The general response pattern was in the format of "Main City, Suburb", or multiple place names. In earlier censuses, only the first of these multiple place names was coded. This was also the case for 1991 in the case of automated system coding, as multiple place names could not qualify for system matches. In order to ensure consistency of processing, the instruction to apply the code of the first place name was maintained. During the post-production phase of Autocoding, all responses coded to "Main Cities in CMAs" were analyzed independently by at least two subject-matter experts. When the response included a place name of a known suburb, the code was changed to that of the suburb.

Non-geographic/Extraneous Responses

Every write-in response had to be assigned a code. The non-geographic or extraneous responses were identified as "Uncodeable", and assigned a value of -2. Some examples are:

- "With my parents";
- "On the farm";
- "Can't remember".

Parsing Strategy

The ACTR software has the capability to perform extensive parsing or standardization of text. Because of the nature of geographic names, where small differences can be very meaningful, ACTR parsing was kept at a minimal level. Province names were standardized, as was the spelling of "Saint". Some available ACTR parsing options that were tested and discarded because of the detrimental impact on data quality and system performance included:

- (a) Specification of "trivial words" - causes system to ignore specified words. If words like "west" were trivialized, then the response "Ottawa west" would match directly with "Ottawa", which is correct. However, "West Vancouver" would match directly with "Vancouver", which is incorrect.
- (b) Specification of numbers as "illegal characters" - causes the system to ignore numbers, and to consider them as word delimiters if they are embedded in a string of text. Many place names, including those of Indian reserves, have numbers as part of their official names. In Ontario alone, there are four reserves with the text "Rainy Lake" in their name. Without the numbers "17A", "17B", "18C", or "26A", it would not be possible to distinguish between them. One recognized type of data capture error is the substitution of "5" for "S" and "2" for "Q". The miskeyed response "Sa5katchewan" would not result in a match, but the system would attempt to match the two "words" "SA" and "KATCHEWAN", with very unpredictable results.

Establishing System Parameters

The system parameters used during production included the requirement to accept "indirect matches", also called "matches by score", in order to maximize the total match rate. After testing several scoring parameters, the ACTR system default (score greater than 3.0 and at least 10% higher than the next highest score) was identified as producing the most acceptable combination of improved match rate and acceptable error rate. During Quality Control and the post-production analysis, scored matches were identified as the main cause of the system error rate (3.4%).

Establishing Procedures for Computer-assisted Manual Resolution

Computer-assisted manual resolution was used to code all responses not coded (directly or indirectly) by the ACTR system. After reviewing manual resolution procedures used in previous censuses, the decision was made to use similar procedures in 1991, mainly for historical comparability. However, some procedures proved to be too complicated and cumbersome, even for a computer-assisted environment. This is even more so when responses for all members of a household need to be checked for additional information if the response in question could not be coded on its own merits.

Identification of Supplementary Reference Material

Supplementary reference materials were identified and obtained both before and during production. Coding staff used these materials as a secondary source of information, for responses that were definitely geographic in nature but could not be coded from the primary reference material (e.g., "Mackinaw Lake"). This material included:

- atlases & gazetteers (Canada and world);
- lists of military establishments (CFBs);
- "partial" codes to be used for provinces/counties.

Commonly Used Abbreviations and Spelling Errors

The ACTR reference file was updated during production to reflect frequently occurring responses of this nature. Some examples are:

- "Mtl" for "Montréal";
- "North Van" for "North Vancouver";
- "T.O." for "Toronto".

Spelling errors were a major contributor to match failure. There are several causes, including:

- respondent error;
- illegible handwriting;
- data capture error (keying).

Although it is not possible to quantify these spelling errors by type, it is possible to use these actual responses as input for the preparation of the 1996 ACTR reference file.

Partial Responses (Geographic)

The ACTR reference file did not contain data which would produce a match for a partial response consisting of the name of a province, or of a county/province. The manual procedures directed coders to check all members of the household for more specific information. If none was available, the code entered was "partially valid" (i.e., the province code followed by 5 zeroes - e.g., "1300000" for "New Brunswick").

Throughout the process of this automated coding, the staff accumulated knowledge of abbreviations and spelling errors. After production was completed, all responses with partially valid codes were analyzed. More precise codes were applied wherever possible.

Responses for "Outside Canada" Recorded in Wrong Box

Unexpectedly, there were many responses indicating foreign place names recorded in the "Inside Canada" write-in box. It is not possible to quantify this phenomenon, as many places in Canada were named in honour of other countries or cities in other countries. For example, in Ontario there is a "Paris", a "Lebanon", and a "Poland", not to mention two municipalities named "London" (City and Township). In order to facilitate E&I processing, and avoid loss of information, a special set of 7-digit pseudo-codes was established. This also required modifications to E&I procedures, such as checking to see if there was any response for the "Outside Canada 5 Years Ago" variable, and which check-off boxes were marked. Responses were reviewed for information that would indicate "Inside Canada" or "Outside Canada", and a code was assigned.

V. Edit and Imputation

In the edit and imputation phase, all remaining errors, discrepancies, inconsistencies and missing answers are identified and corrected by a fully automated series of computer programs (a process which includes imputation). The final set of usable "clean" data (free of invalid, inconsistent and missing responses) is produced, comprising a unique database which provides Canada's most detailed information about the population and its characteristics, ranging from the national to the neighbourhood level.

Errors found at this stage can be the result of respondents answering the questions incorrectly or incompletely, or they can be due to errors generated during coding activities and data capture. After errors are detected, inconsistent information, and values for missing or incomplete entries, are edited and imputed. Imputation, which is the correction of the errors, is done using either a "deterministic" or a "hot deck" (probabilistic) method. For deterministic imputation, errors are corrected by inferring the appropriate value from answers to other questions. The "hot deck" approach selects a record that has a number of characteristics in common with the record in error, and imputes the missing information from this "donor" record.

Two automated systems are used for editing and imputing census data:

- **CANEDIT**

This system is used to correct the 100% demographic data for age, sex, relationship to Person 1 and marital status, and the labour data from the 20% sample (Form 2B).

- **SPIDER (System for Processing Instructions from Directly Entered Requirements)**

The SPIDER system was developed for the 1981 Census to handle the more complex coded variables and absolute values such as income. Most of the questions asked of 20% of the population are processed using SPIDER.

A. Weighting

One in every five households, or 20% of the population, receives a more detailed long questionnaire (Form 2B) and is asked additional socio-economic questions. A weighting algorithm is developed so that these data can be used to estimate the response from 100% of the population. The procedure to weight sample data in 1991 has been revised from the one used for the 1986 Census and is known as the "Generalized Least Squares Estimation Procedure (GLSEP)". The GLSEP begins with initial weights of approximately 5 and then, using basic census information known for every person, e.g. age, sex and marital status, adjusts them to obtain the desired agreement between the sample estimates and the population counts. Once data are finalized and weights are calculated, final data are transferred to the Canada Retrieval Databases; these databases are used to produce the published and custom products.

B. Edit and Imputation (E&I) for Mobility

Edit and imputation for mobility status involved performing two specific tasks: the detection and correction of missing, incomplete or inconsistent responses; and the assignment of mobility status to the population in the age group 5-14 for the 5-year interval data and in the age groups 1-14 for the 1-year interval data.

Two major types of imputation were used: deterministic, where errors and/or missing/partial responses were inferred from other questionnaire answers; and probabilistic, which selected a "donor" record according to a number of characteristics that are similar to those for the record requiring imputation. This latter type of assignment is also known as "hot-deck" imputation. The automated system used to handle edit and imputation of mobility data is known as "SPIDER" (System for Processing Instructions from Directly Entered Requirements).

A number of consistency checks and corrections, and various imputations, are performed during the course of E&I. As a first step, the E&I process identifies the answers of each respondent according to whether or not they are valid

or complete. Check-off boxes are compared to identify single, blank and invalid (multiple) responses. Codes of write-ins (which were coded during Automated Coding) are also analyzed to determine whether or not they are valid, which parts of them are valid, and which parts will require imputation. For example, the respondent may have indicated only the province of residence five years ago, not the municipality; therefore, the missing part - municipality - will require imputation.

In addition to these checks, the "universe" of respondents is also reviewed - any respondents in collective households or overseas are screened out of edits, because these are outside the mobility universe. Any responses of the population aged 5 to 14 or 1 to 14 are retained, even though the scope of the question was limited to the population aged 15 and over.

Edit rules for "within-person" conflicts for mobility are applied to the population aged 5 and over for the 5-year interval data and aged 1 and over for the 1-year interval data. All possible combinations of responses are checked to see whether or not the responses are conflict-free. If conflicts are detected, then corrective action is requested. For example, a within-person conflict could arise if a respondent had indicated that he or she had lived in a different CSD five years ago, yet the CSD of residence 5 years ago provided was the same as the respondent's current CSD of residence. This inconsistency would be corrected so that the respondent would be assigned the mobility status of "same CSD" instead of "different CSD" as originally indicated. This type of imputation is deterministic. In the case of responses where only part of the place name is valid (for example, province only), the valid part is retained and only the missing or invalid part (for example, municipality) is imputed from a donor record. Imputation of mobility status and/or place of residence 5 years ago or 1 year ago is based on a "clean" donor or record, one that has been edited and, where necessary, imputed. The "donor" (or "imputer") is usually a member of the same census or economic family as the "imputee". The priority list for donor selection is as follows: (i) the census family reference person; (ii) any other member of the census family; (iii) the economic family reference person; and (iv) any other member of the economic family. If family-based imputation is not possible (e.g., in the case of a one-person household), then another form of probabilistic imputation is used, known as a "hot-deck" search. This involves finding a "donor" with a similar set of characteristics (age, sex, marital status, aboriginal residence (on/off reserve) and mother tongue), based on 500 records or one census division, whichever limit is reached first. When a donor was not found, a random assignment was made. The most appropriate donor is determined through a series of weights reflecting the best match of variables between the donor and the record to be imputed.

1. Impact of Edit and Imputation

Mobility data were screened for errors, such as illogical entries, multiple responses and incomplete or missing responses. These "errors" could be made either by respondents, or in the course of coding and processing (e.g., incorrect keying of codes during DDE). Values for missing, incomplete or inconsistent responses were imputed for 10.3% of all responses to the question on the place of residence five years ago (see Table 5). This is somewhat higher than the percentage for 1986 (6.8%) due to the split of the mobility 5-year question and the addition of a write-in box for the country name, which was introduced for the first time in 1991. In particular, the introduction of the filter question caused about 40% of over-response. For example, about 40% of those who responded in the filter question that they lived at the same address in 1991 as they did in 1986 did not skip the second part of the mobility question but checked the first category of the question "Lived in the **same** city...". This category had to be checked by the respondents who moved within the same census subdivision. These two reasons also explain the high percentage of edit, at 24.5% for the 5-year data. The percentage of edit for 1-year data was 3.0% and the imputation percentage was 12.7%. The percentage of imputation includes the data for the population aged 5-14 and 1-14 which were imputed on the basis of data concerning other family members for the 5-year interval data and the 1-year interval data, respectively.

Table 5. Percentage Edited and Imputed by Methods for 5-year and 1-year Mobility Data: Canada, 1991 Census

Area	Deterministic Edit	Imputation Method				Total Number Edited or Imputed	Percent Edited or Imputed	All Cases
		Total	Family	Hot Deck	Random			
5-year Data	24.5	10.3	8.9	1.4	0.0	2,052,441	34.7	5,907,584
1-year Data	3.0	12.7	11.9	0.8	0.01	924,296	15.7	5,907,584

Source: 1991 Census of Canada, unpublished tabulations.

2. Fixes After Edit and Imputation

After the retrieval database was created, the data were analyzed once more to determine whether or not they were acceptable for release. Several problems were identified which severely affected the data, specifically interprovincial migration flows for the 5-year interval data. These data problems were traced back through E&I and then to their origins in Autocoding. Corrective action was taken, and documentation was created for use in the creation of the 1996 Autocoding reference file to avoid reoccurrences. Corrective action was taken only for those situations that had a very high frequency. All variables pertaining to the place of residence 5 years ago had to be reviewed in case change was required. These variables included PR5, CMA5, POP5, CSDDTYPE5, and others ending in "5". In the following examples, only the PCSD5 code is mentioned, but all mobility variables could have been affected.

- "St. John's" is a unique place name, and when spelled correctly, resulted in a direct match with the correct code (1001519). Problems arose when respondents (or data capture) recorded "St. Johns" (no apostrophe) or "St. John s" (a blank space instead of the apostrophe). The former was coded to 2456080 ("St. Johns" in Quebec), and the latter was coded to 1009047 ("St. John Island" in Newfoundland). In total, 3,009 records required changes in order to correct this problem.
- "Saskatchewan" is not only the name of a province. It is also the official name of a municipality in Manitoba. Normally, responses containing only provincial names received a partially valid 7-digit code. In this case, the system coded them to "4615027" instead of "4700000". Revisions were made to 1,050 records.
- "St. Hubert" (PEI) and "Saint-Hubert" (Quebec) are also unique place names. This problem demonstrated the need to analyze duplicate place names after ACTR parsing, instead of before. It resulted in 254 records being recoded from 1103031 to 2458020.

Certification of mobility data showed that the change in distribution of conflict-free records before and after imputation was not significant. Both the unedited and edited distributions of the mobility status variable yielded similar results, with the same variations in mobility by age groups and provinces/territories. Differences were small, with a slightly higher proportion of migrants in the edited distribution; 19.9% of the population aged 15+ were migrants, compared to 17.1% of the unedited, non-blank, conflict-free records. Corresponding to this slight increase, there were slight decreases in non-movers and non-migrants (see Table 6).

Table 6. Mobility Status Distributions, Unedited and Edited, 1991 Census

Mobility Status	Unedited, With Blanks and Inconsistencies	Unedited, Without Blanks and Inconsistencies	Edited (after E&I)
	%	%	%
Same Dwelling (Non-movers)	53.7	56.8	53.3
Same CSD (Non-migrants)	22.1	23.4	23.2
Different CSD within Canada (Internal migrants)	16.2	17.1	19.9
Outside Canada (External Migrants)	2.5	2.6	3.7
Blanks and Inconsistencies	5.5	N/A	N/A
	100.0	100.0	100.0

Source: "Certification for 1991 Census Mobility Status Data: Summary Report", by Y.E. Shin. Unpublished document, Demography Division, April 1993.

C. Retrieval of Mobility Variables

1. Variables for 5-year Interval Data

Upon completion of E&I, including 2B weighting, the retrieval database is loaded in a phase known as Retrieval Data Base Creation. Fourteen mobility variables are available from the retrieval database. Some of these variables were derived during E&I and copied to the retrieval database (such as mobility status, area of residence 5 years ago (e.g., province of residence 5 years ago)) while those pertaining to place of residence 5 years ago (except PCSD5 and CO5) are created directly on the base during "post-E&I variable derivation". The fourteen variables are:

- (1) MOB5 - mobility status variable which classified each member of the population either as a mover/non-mover, migrant/non-migrant, external migrant or internal migrant;
- (2) PR5 - province of residence 5 years ago;
- (3) PR - current province of residence;
- (4) PCD5 - census division of residence 5 years ago;
- (5) PCD - current census division of residence;
- (6) PCSD5 - census subdivision of residence 5 years ago;
- (7) PCSD - current census subdivision of residence;
- (8) CMA5 - census metropolitan area or census agglomeration of residence 5 years ago;
- (9) CMA - current census metropolitan area or census agglomeration of residence;
- (10) POP5 - population size group of place of residence 5 years ago;
- (11) POP - population size group of current place of residence;
- (12) RUUB5 - rural/urban classification of the place of residence 5 years ago;

- (13) CO5 - country of origin of external migrants;
- (14) CSDTYPE5 - type of census subdivision of residence 5 years ago.

More complete definitions of these variables can be found in Appendix B.

These variables facilitate the production of origin-destination matrices and various measures of migration.

The variable for rural/urban place of residence 5 years ago (RUUB5) requires special attention, due to its method of derivation, particularly in the case of migrants whose previous place of residence was a mixed rural/urban census subdivision. The values for RUUB5 are not directly available from the mobility question. They are derived indirectly for all respondents (except migrants from outside Canada) on the basis of the current rural/urban composition of CSDs. The non-migrant population is assigned RUUB5 according to the current census subdivision of residence. If a current or previous census subdivision (PCSD, PCSD5) has only an urban or rural population component, then the derivation of RUUB5 is straightforward. For internal migrants (i.e. those who lived in a different CSD 5 years ago), rural or urban place of residence is assigned proportionately on the basis of the **current** 1991 ratio of urban to rural population of the CSD they resided in 5 years ago.

2. Variables for 1-year Interval Data

In similar fashion, four variables have been created for the 1-year interval mobility data:

- (1) MOB1 - mobility status variable which classified each member of the population either as a mover/non-mover, migrant/non-migrant, external migrant or internal migrant;
- (2) PR1 - province of residence 1 year ago;
- (3) PR - current province of residence;
- (4) CO1 - country of origin of external migrants.

More complete definitions of these variables can be found in Appendix B.

These variables facilitate the production of origin-destination matrices and various measures of migration at the provincial/territorial level.

VI. Data Evaluation

A. General

Throughout the census-taking process, care was taken to ensure high-quality results. Rigorous quality standards were set for data collection and processing, and the Public Communications Program assisted in minimizing non-response. A Data Quality Measurement Program was established to provide users with information on the quality of census data and also to identify any of its limitations.

Although considerable effort is made throughout the entire process to ensure high standards of data quality, resulting data are subject to a certain degree of inaccuracy. To assess the usefulness of census data for their purposes and to understand the risk involved in drawing conclusions or basing decisions on these data, users should be aware of their inaccuracies and appreciate their origin and composition.

Error can arise at virtually any stage of the census process, from preparation of materials to data collection, and through the various processing stages. Some errors occur at random and tend to cancel each other out when individual responses are aggregated for a large group. For errors of this nature, the larger the group, the more accurate the corresponding estimate and therefore it is important to be cautious when dealing with estimates derived using small aggregated groups of responses. On the other hand, some errors occur more systematically, and such errors are generally more serious to data users than random errors.

For census data in general, the principal types of errors are as follows:

- **Coverage Errors**

Occur when individuals and/or dwellings are missed, incorrectly included, or double counted.

- **Non-response Errors**

Occur when responses are not available from some households and/or individuals due to extended absence or for other reasons.

- **Response Errors**

Occur when respondents, or in some instances census representatives, misinterpret a census question and record an incorrect response.

- **Processing Errors**

Can occur during **coding**, when write-in responses are transformed into numerical codes by clerks; or **data capture**, when responses are transferred from questionnaires to computer tapes by key entry operators; or **imputation**, when a valid, but not necessarily correct, response is inserted by the computer into a record to replace missing or invalid data.

- **Sampling Errors**

Only apply to supplementary questions on the long (2B) questionnaire, which are asked of only a twenty percent (20%) sample of households; arise due to the fact that they are weighted to represent the whole population; and inevitably differ somewhat from results that would have been obtained had the questions been asked of the total population.

All of the above errors have both random and systematic components. Usually the systematic component of sampling errors is very small in relation to their random component. For other non-sampling errors, both random and systematic components may be significant.

Four studies are undertaken to measure coverage errors:

- Vacancy Check
- Temporary Residents Study
- Reverse Record Check
- Overcoverage Study

Two studies are conducted to evaluate response errors:

- Reverse Record Check Content Study
- Overcoverage Content Study

Four studies are undertaken to evaluate the effect of sampling errors on the sample data:

- Sampling Bias Study
- Weighting Evaluation
- 2A/2B Consistency Study
- Sampling Variance Study

On some Indian reserves and settlements (a total of 78), enumeration was not permitted or was interrupted before completion, or the quality of collected data was considered to be inadequate. These areas are called **incompletely enumerated Indian reserves and Indian settlements**. Under these circumstances, data are not available for these areas, are not included in tabulations, and are noted accordingly where applicable. Caution should be exercised when analyzing data from areas affected by incomplete enumeration, especially small areas, where the impact is the greatest.

The inclusion of **non-permanent residents** in the 1991 Census will affect both variables whose data were collected on a one hundred percent (100%) basis and twenty percent (20%) basis. For example, it will affect the age, sex, mother tongue, and marital status variables which were collected on a 100% basis and the mobility variables which were collected on a 20% basis.

For additional information on non-permanent residents, please refer to Chapter III, Data Collection and Coverage.

B. Data Quality of Mobility and Migration Variables

1. Mobility 5-year Interval Data at National and Provincial/Territorial Levels

Prior to their release, census data on mobility were evaluated for purposes of certification. Evaluation of mobility data consisted of comparisons with past census data, and where possible, with other data sources, particularly estimates of annual interprovincial migration produced by the Estimates Section of the Demography Division. For purposes of comparison with previous censuses, it should be noted that the collection and processing of mobility data have not changed significantly since 1961. Between 1981 and 1986, only minor modifications concerning the mobility question and imputation procedures were introduced. In 1991, the usual question on the place of residence 5 years ago was divided into two questions: a filter question and a subsequent question. The filter question was introduced to differentiate at the outset people who did not move from those who moved between 1986 and 1991. A subsequent question was asked only to those who moved, so as to obtain details on the place of residence 5 years ago.

Overall, the quality of 1991 mobility data at the provincial and national levels is good. Comparisons with 1986 suggest that data on mobility status distributions for age groups and provinces are acceptable. Trends in mobility and migration appear to be valid in that they are not a function of changes in processing or types of respondent error,

nor does the differential undercoverage between censuses appear to be a strong explanatory factor. Patterns of in- and out- and net interprovincial migration are consistent with those produced from annual estimates for the 1986-91 period, and age/sex differentials in mobility and migration are similar to those observed in earlier censuses. Finally, data on rural/urban migration were derived reasonably well, and age-sex patterns of rural/urban migration are similar to those of 1986.

While the overall quality of mobility data appears reasonable at the national and provincial levels, there are some indications that there may be a general undercount of the volume of migrants due to respondent error/misunderstanding. However, the extent of this undercount is not certain, nor is it confined to the 1991 Census. The same type of misreporting occurred in earlier censuses.

(a) Mobility Status (MOB5)

1. Non-response and Partial Response

The rate of non-response ("blanks" - includes responses that cannot be coded) for mobility status was 4.8%, and the percentage of partial and multiple responses (invalids) was 0.7%. As in the 1986 Census, the population of youths and young adults had the highest percentage of blanks and invalids in 1991, at 6.4% for the 15-19 age group and 7.8% for the 20-34 age group. Geographically, the percentage of blanks and invalids was highest in the territories (as in 1986), at 12.2% for the Yukon, and 7.4% for the Northwest Territories for 1991. In general, rates of non-response and partials were slightly higher in 1991 than in 1986, and the overall rate as well, 5.5% vs. 4.6% in 1986. Rates of non-response for the 1991 Census by age groups, for Canada, provinces and territories, are provided in Table 7.

Table 7. Invalid-response and Non-response Rates of Population 15 Years and Over for Mobility Status by Selected Age Groups: Canada, Provinces and Territories, 1986-1991

Area	Filter Question (1)	Subsequent Question (2)	Combined ¹				
			Age 15+ (3)=(1)+(2)	Age 15-19	Age 20-34	Age 35-64	Age 65+
Canada	1.0	9.9	5.5	6.4	7.8	4.4	3.3
Invalid	0.2	0.7	0.7	0.6	1.0	0.6	0.5
Non-response	0.8	9.1	4.8	5.8	6.8	3.8	2.8
Nfld.	0.6	8.5	2.9	3.2	4.4	2.0	1.7
Invalid	0.1	0.2	0.2	0.2	0.3	0.2	0.2
Non-response	0.5	8.3	2.7	3.0	4.1	1.8	1.5
P.E.I.	0.6	11.1	4.2	5.0	6.6	3.0	2.7
Invalid	0.0	0.4	0.3	0.4	0.4	0.2	0.3
Non-response	0.6	10.7	4.0	4.7	6.2	2.8	2.4
N.S.	0.6	8.7	3.8	4.3	5.7	3.0	2.0
Invalid	0.0	0.2	0.2	0.3	0.3	0.2	0.2
Non-response	0.6	8.5	3.6	4.1	5.4	2.8	1.9
N.B.	0.7	8.6	3.5	4.2	5.5	2.5	2.0
Invalid	0.0	0.3	0.3	0.2	0.4	0.2	0.2
Non-response	0.6	8.3	3.3	3.9	5.1	2.3	1.7
Que.	0.8	10.4	5.2	5.8	7.3	4.2	3.5
Invalid	0.1	0.3	0.3	0.3	0.4	0.3	0.3
Non-response	0.7	10.1	4.9	5.5	6.9	3.9	3.2
Ont.	1.2	10.7	6.2	7.2	8.8	5.0	3.3
Invalid	0.3	1.1	1.0	0.8	1.4	0.9	0.6
Non-response	1.0	9.6	5.2	6.4	7.4	4.1	2.7
Man.	0.9	6.9	3.7	4.8	5.3	2.9	2.4
Invalid	0.3	0.8	0.9	0.8	1.3	0.7	0.8
Non-response	0.6	6.1	2.8	4.1	3.9	2.2	1.6
Sask.	0.8	6.9	3.4	4.9	5.1	2.5	2.1
Invalid	0.3	0.7	0.8	0.7	1.2	0.6	0.6
Non-response	0.4	6.2	2.6	4.2	3.9	1.8	1.4
Alta.	0.9	8.1	5.1	6.6	7.0	3.8	3.6
Invalid	0.3	1.0	1.0	1.0	1.5	0.8	0.8
Non-response	0.6	7.1	4.1	5.7	5.5	3.0	2.8
B.C.	1.1	10.8	6.8	8.4	9.1	5.6	4.6
Invalid	0.1	0.6	0.6	0.5	0.8	0.5	0.5
Non-response	1.0	10.2	6.1	7.9	8.3	5.1	4.1
Yukon	4.5	14.0	12.2	14.7	13.6	10.4	13.9
Invalid	0.3	0.7	1.0	1.3	1.2	0.9	0.3
Non-response	4.1	13.4	11.2	13.5	12.4	9.6	13.6
N.W.T.	2.0	8.0	7.4	8.9	8.4	6.3	3.2
Invalid	0.2	0.4	0.7	0.3	0.8	0.6	0.7
Non-response	1.8	7.6	6.8	8.6	7.6	5.7	2.5

1 Rates were calculated after combining responses for the filter question and those for the subsequent question. Therefore, rates for "Age 15+" are not the sum of two rates (Columns 1 and 2).

Source: 1991 Census of Canada, unpublished tabulations.

2. Distributions

Both the unedited and edited distributions of the mobility status variable yield similar results, with the same variations in mobility by age groups and provinces/territories. As indicated in Section V, the change in distribution due to imputation was not significant. Differences are largely related to the inclusion of the 5-14 population in the edited data, for which mobility status is imputed.

Both the unedited and edited distributions show that mobility peaks in the 25-29 age group. This age group has the highest proportions of movers (76.9% edited) and migrants (40.3% edited). See Table 8 for 1991 distributions of population by mobility status, for selected age groups and sex (based on edited data). The age patterns of mobility based on 1991 data are similar to those of the previous census.

Table 8. Distribution of Population 5 Years and Over by Age Groups and Sex, Showing Mobility Status: Canada, 1991 Census

Age and Sex	%		%	
	Non-movers	Movers	Non-migrants	Migrants
5 +	53.3	46.7	23.2	23.5
Males	53.3	46.7	23.1	23.6
Females	53.3	46.7	23.3	23.4
5 - 14	48.5	51.5	27.3	24.2
Males	48.6	51.4	27.3	24.1
Females	48.3	51.7	27.4	24.3
15 - 19	60.0	40.0	19.9	20.0
Males	61.6	38.4	19.1	19.3
Females	58.4	41.6	20.9	20.8
20 - 24	39.8	60.2	27.4	32.9
Males	45.5	54.5	24.9	29.6
Females	34.0	66.0	29.9	36.2
25 - 29	23.1	76.9	36.6	40.3
Males	25.0	75.0	35.8	39.2
Females	21.3	78.7	37.4	41.3
30 - 34	32.8	67.2	32.7	34.5
Males	31.2	68.8	33.6	35.3
Females	34.4	65.6	31.8	33.8
35 - 44	51.8	48.2	24.1	24.1
Males	50.2	49.9	24.7	25.2
Females	53.4	46.7	23.5	23.1
45 - 54	67.1	32.9	16.8	16.1
Males	66.3	33.7	17.1	16.7
Females	67.9	32.1	16.6	15.5
55 - 64	73.9	26.1	12.9	13.2
Males	74.3	25.7	12.6	13.2
Females	73.5	26.5	13.3	13.3
65+	77.8	22.3	11.5	10.7
Males	78.7	21.3	10.4	10.9
Females	77.0	23.0	12.4	10.6

Source: 1991 Census of Canada, unpublished tabulations.

(b) Evaluation of Trends in Mobility and Migration

Compared to the 1986 Census, the level of mobility and migration in 1991 has increased. An examination of the edited mobility status data for the past censuses shows that there has been a steady decrease in the percentage of movers since 1976: from 48.5% in 1976 to 47.6% in 1981 to 43.7% in 1986; and a steady decrease in the percentage of migrants: from 25.1% in 1976 to 22.7% in 1981 to 19.5% in 1986 (see Table 9). Similar downward trends have also occurred across various age groups, as illustrated in Figures 4a and 4b. This trend, however, was reversed in 1991, mainly due to an increase in the number of immigrants (external migrants) and to the addition of non-permanent residents to the population universe. These would almost all be from outside Canada in both the 1-year and 5-year questions.

Table 9. Movers and Migrants as a Percentage of Population 5 Years and Over: Canada, 1961-1991 Censuses

Census Year	Total 5+ Population	Mobility Status			
		% Non-movers	% Movers	% Non-migrants	% Migrants
1961	15,302,600	54.6	45.4	25.2	20.2
1971	19,717,200	52.6	47.4	23.5	23.9
1976	21,238,900	51.5	48.5	23.5	25.1
1981	22,280,100	52.4	47.6	24.9	22.7
1986	23,189,300	56.3	43.7	24.2	19.5
1991	24,927,900	53.3	46.7	23.2	23.5

Sources: 1986 Census of Canada. The Nation: *Mobility Status and Interprovincial Migration*, Table 1, Catalogue No. 93-108.
1991 Census of Canada. The Nation: *Mobility and Migration*, Table 1, Catalogue No. 93-322.

An assessment was made of various factors that could affect the reliability of these trends. The impact of changes in processing, undercoverage, and respondent error was examined. Changes in the processing of census mobility data were minimal between censuses. However, both respondent error and undercoverage, associated with data quality, do have the potential to affect the levels of mobility and migration. It is difficult to assess the extent to which the impact of these two factors would vary from census to census, and hence, their effect on trends. However, the reversed trends in 1991 are partly due to the changes in the number of external migrants. This number has changed from 719,700 in 1976, 556,200 in 1981, 463,900 in 1986 and underwent a sharp increase to 913,300 in 1991. Another major factor contributing to reversing trends is the non-permanent residents category which was counted in the 1991 Census. This category counts 223,400 persons, a majority of whom might have lived outside Canada one year ago and/or five years ago.

- Impact of Undercoverage**

Net undercoverage rates for the 1991 Census on the mobility questions are presented in Table 10 along with the gross undercoverage rates from the 1986 Census so that the reader may see some of the impact of the undercoverage. Undercoverage is especially relevant to mobility, since people who move are more liable to be missed in the census. According to undercoverage results of the 1991 Census, non-movers were the least likely to have been missed, while persons who migrated to Canada between the censuses had a relatively high chance of being missed (for information on the 1986 Census mobility data, see Bourdreau, J.R. and M.F. Germain, 1990). Similarly, the 1986 Census also showed higher undercoverage rates for interprovincial migrants than for the general population (see Table 10). The undercoverage rate for those who moved from outside Canada was even higher in 1991 than in 1986. This higher 1991 rate is due to the increase in the level of immigration and the addition of non-permanent residents. Undercoverage due to mobility is most likely to affect the young and adult age groups, since this population tends to be the most mobile.

Table 10. Estimated Population Undercoverage for Mobility Status Characteristics: Canada, 1986 and 1991 Reverse Record Checks**(a) 1991 Reverse Record Check for Place of Residence Five Years Ago**

Mobility Status Characteristics	1986 Population Undercoverage Rates (Population 5 Years and Over)		1991 Population Net Undercoverage Rates (Population 15 Years and Over)	
	Estimated Rate %	Standard Error %	Estimated Rate %	Standard Error %
Total	3.42	0.12	2.87	0.17
Remained within same province	3.19	0.13	2.34	0.17
- Did not move	1.59	0.14	0.25	0.18
- Moved within province	5.49	0.27	5.16	0.29
Moved from another province	5.88	0.72	3.80	0.62
Moved from outside Canada	8.92	0.60	13.87	0.90

Sources: User's Guide to the Quality of 1986 Census Data: *Coverage*, Statistics Canada, Catalogue No. 99-135E.
1991 Census Technical Reports: *Coverage*, Statistics Canada, Catalogue No. 92-341E.

Note: One should note that the rates between 1991 and 1986 are not comparable. The rates for the 1991 Census are different from those for the 1986 Census in four aspects: (1) the 1991 rates are net undercoverage rates, while the 1986 rates are gross undercoverage rates; (2) the 1991 rates are for the population 15 years and older, while the 1986 rates are for the population 5 years and older; (3) the 1991 rates include the non-permanent residents, whereas the 1986 rates do not; and (4) the 1991 rates include data for the Yukon and Northwest Territories, whereas the 1986 rates do not.

(b) 1991 Reverse Record Check for Place of Residence One Year Ago

Mobility Status Characteristics	Population Net Undercoverage Rates (Population 15 Years and Over)	
	Estimated Rate %	Standard Error %
Total	2.87	0.17
Remained within same province	2.59	0.17
- Did not move	1.63	0.16
- Moved within province	7.80	0.55
Moved from another province	9.70	1.36
Moved from outside Canada	19.99	1.84

Source: 1991 Census Technical Reports: *Coverage*, Statistics Canada, Catalogue No. 92-341E.

• **Impact of Respondent Error**

There is evidence from both current and previous censuses that respondents tend to misreport whether or not they lived in a different CSD 5 years ago, as well as the name of the municipality they had lived in. A study of past censuses (1976, 1981), including results of the 1981 RRC, indicate that some respondents who had lived in metropolitan areas tended to confuse their suburban municipality with the main city (e.g., Ottawa instead of Nepean). To the extent that this type of misreporting occurred among respondents who had moved within a metropolitan area, the level of migration could be underestimated. Exactly because of this misreporting, manual corrections were made for the cities in each of 25 census metropolitan areas.

As well, other errors in misreporting contributing to undercounts of migrants could include respondents reading only the first part of an answer category (i.e., "Lived in a different dwelling"), but not the rest (i.e., "in this city, town...") and indicating this category instead of "different city".

However, it is difficult to assess the extent to which these types of error would vary from census to census, and hence, their impact on the levels and trends in migration over time. Generally, these respondent errors are not unique to any one census.

• Impact of Aging

If age-specific mobility and migration rates were to remain the same while the population continued to age, one would expect a decline in mobility/migration for the population as a whole (since mobility decreases with age). An examination of age-sex specific rates for the 1981 and 1986 Censuses indicates that mobility and migration have declined across all age groups for both sexes. This indicates that the decline between 1981 and 1986 is not related to aging, but rather to other factors, probably economic in nature. (As well, when 1981 rates for the population as a whole were standardized for the 1986 age-structure, there was practically no change from the unstandardized rates.)

(c) Interprovincial Migration (PR, PR5)

The evaluation of provincial migration patterns involved a comparison of 1991 Census data on in-, out- and net migration with estimates of annual interprovincial migration. Estimates which are produced by the Estimates Section of the Demography Division are based on two sources of administration data: Family Allowance and Income Tax files. There are some limitations in comparing the two sets of data (census and estimates), since:

- (1) census data on migration exclude the population aged 0-4;
- (2) census data are imputed for the population aged 5-14; and,
- (3) census data are based on place of residence 5 years ago and, therefore, exclude return and multiple migrants, as well as any migrants who died over the 5-year intercensal period.

These limitations will affect comparability more for the volume of interprovincial migration than for patterns of in-, out- and net migration.

(1) Volume of Interprovincial Migration

Because of their differences, the number of interprovincial migrants from the census will be less than the aggregated number of annual interprovincial migrants over the 5-year period. As a percentage of the total number for the 1986-1991 period, based on annual estimates, the 977,075 interprovincial migrants from the 1986 Census represented 60% of the 1.6 million migrants counted on the basis of Income Tax estimates, and 52% of the almost 1.9 million migrants estimated from the Family Allowance data.

(2) Distributions of In- and Out-migrants

Both unedited and edited distributions of in- and out-migrants by province and territory from the 1991 Census show that Ontario was the major destination, followed by British Columbia, and that Ontario and Alberta were the major sources of interprovincial migrants over the 1986-91 period. This is somewhat similar to the 1986 data for the 1981-86 period, but is in sharp contrast to 1981 Census data for the 1976-81 period, in which Alberta was the major receiver and Ontario the major source (see Table 11).

Data from estimates (both Family Allowance and Income Tax) confirm the 1991 distributions of in- and out-migrants, and the changes from 1986 (see Table 12). For all three years, 1981, 1986 and 1991, census distributions are closer to the Income Tax-based estimates than to those from Family Allowance, especially for the provinces with large numbers of migrants.

(3) Net Interprovincial Migration

A comparison of net interprovincial migration levels between those of the census and of the annual estimates for 1986-91 indicate that both the direction and magnitude of the levels are consistent between the two sets of data (see

Table 13). For most provinces and territories, net migration levels based on Income Tax estimates are closer to census data than those from Family Allowance estimates. In some cases, census and Income Tax estimates are closer than the two administrative-based estimates.

In general, census data on interprovincial migration show changes over time according to all three sources of migration data: in 1986-91 there are two centres, Ontario and British Columbia, and in 1981-86 there is an eastward migration trend, a reversal of the 1976-81 westward trend.

Table 11. Unedited and Edited Distributions of Provincial In- and Out-migrants Based on the Variables PCSD5U and PCSD5, 1981, 1986 and 1991

Interprovincial Migration Component	1981		1986		1991	
	Unedited PCSD5U	Edited PCSD5	Unedited PCSD5U	Edited PCSD5	Unedited PCSD5U	Edited PCSD5
	%	%	%	%	%	%
In-migrants						
Nfld.	1.4	1.6	1.7	1.8	2.1	2.1
P.E.I.	0.8	0.9	1.0	1.0	0.9	0.9
N.S.	4.7	4.8	6.0	5.9	5.2	5.5
N.B.	3.5	3.6	3.9	4.0	3.5	3.7
Que.	5.5	5.4	7.1	7.2	8.0	8.4
Ont.	21.8	22.0	29.6	30.9	25.9	27.6
Man.	4.8	4.7	6.4	6.1	4.6	4.5
Sask.	5.5	5.6	5.7	5.9	4.4	3.9
Alta.	27.7	29.5	19.0	19.2	16.6	17.4
B.C.	20.0	20.6	16.1	16.4	22.9	24.4
Yukon	1.1	0.6	1.0	0.5	1.5	0.7
N.W.T.	3.3	0.8	2.4	1.0	4.7	1.0
Canada (Number) ¹	200,970	1,140,545	167,095	924,480	201,302	977,052
Canada (Percent)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Out-migrants						
Nfld.	3.5	3.4	3.7	3.6	3.6	3.6
P.E.I.	0.9	0.9	0.9	0.9	1.0	1.0
N.S.	5.6	5.5	5.4	5.3	5.8	6.0
N.B.	4.5	4.4	4.2	4.1	4.2	4.3
Que.	17.9	17.8	14.3	14.1	10.4	11.0
Ont.	28.6	28.8	20.5	20.1	22.4	22.8
Man.	8.5	8.6	6.3	6.3	8.5	8.1
Sask.	6.1	6.1	6.1	6.2	10.2	10.1
Alta.	12.1	12.2	21.2	22.2	20.3	20.0
B.C.	10.8	10.8	15.5	15.4	11.8	11.5
Yukon	0.7	0.6	0.8	0.8	0.6	0.6
N.W.T.	1.0	1.0	1.1	1.1	1.3	1.2
Canada (Number) ¹	200,970	1,140,545	167,095	924,480	201,302	977,052
Canada (Percent)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

1 Unedited counts refer to unweighted data, and edited counts refer to weighted data.

Sources: Statistics Canada, 1990, Table 7.
1991 Census of Canada, unpublished tabulations.

Table 12. Distribution of Provincial In- and Out-migrants Based on Annual Estimates, 1976-1981, 1981-1986 and 1986-1991

Province	1976-1981 Estimates		1981-1986 Estimates		1986-1991 Estimates	
	Family Allowance	Income Tax	Family Allowance	Income Tax	Family Allowance	Income Tax
	%	%	%	%	%	%
In-migrants						
Nfld.	2.6	2.3	2.4	2.5	2.6	2.9
P.E.I.	1.0	1.0	1.0	1.0	1.0	1.0
N.S.	5.5	5.3	5.6	6.0	5.5	5.7
N.B.	4.6	4.0	4.3	4.3	4.2	4.2
Que.	6.6	6.7	7.8	7.7	8.3	8.3
Ont.	23.1	23.3	27.5	29.0	27.2	27.8
Man.	6.1	5.5	6.2	6.3	5.4	5.3
Sask.	7.0	5.9	6.2	6.3	4.9	4.8
Alta.	23.7	25.1	21.2	19.8	18.2	17.2
B.C.	18.3	19.1	16.4	15.3	21.1	21.1
Yukon	0.6	0.7	0.6	0.6	0.7	0.7
N.W.T.	0.9	1.1	1.0	1.2	1.0	1.1
Out-migrants						
Nfld.	3.0	3.4	3.1	3.5	3.3	3.8
P.E.I.	1.0	1.0	1.0	1.0	1.0	1.0
N.S.	5.5	5.7	5.3	5.5	5.6	5.8
N.B.	4.5	4.6	4.4	4.3	4.3	4.4
Que.	14.2	15.2	11.7	13.1	10.0	10.7
Ont.	25.9	26.5	21.6	20.9	25.3	23.5
Man.	8.5	7.8	6.4	6.4	7.0	7.5
Sask.	6.3	6.4	6.3	6.4	7.7	8.8
Alta.	16.4	15.0	22.8	21.9	19.2	19.7
B.C.	12.7	12.4	15.8	14.8	14.8	12.9
Yukon	0.7	0.8	0.7	0.8	0.6	0.7
N.W.T.	1.1	1.3	1.0	1.2	1.1	1.3
Total Provincial Migrants	2,062,978	1,834,935	1,972,312	1,500,602	1,890,664	1,626,575

Source: Population Estimates Section, Demography Division, Statistics Canada.

Table 13. Summary of Net Interprovincial Migration Estimates Based on Different Sources, 1976-1981, 1981-1986 and 1986-1991

Reference Period and Province	Family Allowance Estimates (1)	Income Tax Estimates (2)	Census Estimates (3)	Difference		
				(1-2)	(3-1)	(3-2)
1976-1981						
Nfld.	-8,283	-18,983	-19,830	10,700	-11,547	-847
P.E.I.	1,326	-829	-15	2,155	-1,341	81
N.S.	-68	-7,140	-8,420	7,072	-8,352	-1,280
N.B.	3,846	-10,351	-8,505	14,197	-12,351	1,846
Que.	-156,934	-156,496	-141,725	-438	15,209	14,771
Ont.	-58,819	-57,826	-78,070	-993	-19,251	-20,244
Man.	-49,438	-42,218	-43,600	-7,220	5,838	-1,382
Sask.	8,745	-9,716	-5,820	18,461	-14,565	3,896
Alta.	150,524	186,364	197,645	-35,840	47,121	11,281
B.C.	115,267	122,625	110,930	7,358	-4,337	-11,695
Yukon	-1,592	-933	-545	-659	1,047	388
N.W.T.						
1981-1986						
Nfld.	-4,574	-4,497	-2,045	-77	2,529	2,452
P.E.I.	-14,837	-15,051	-16,550	214	-1,713	-1,499
N.S.	293	751	1,535	-458	1,242	784
N.B.	5,204	6,895	6,280	-1,691	1,076	-615
N.B.	-2,239	-65	-1,370	-2,174	869	-1,305
Que.	-76,040	-81,254	-63,300	5,214	12,740	17,954
Ont.	115,497	121,767	99,350	-6,270	-16,147	-22,417
Man.	-3,700	-2,634	-1,550	-1,066	2,150	1,084
Sask.	-668	-2,974	-2,820	2,306	-2,152	154
Alta.	-34,073	-31,676	-27,670	-2,397	6,403	4,006
B.C.	13,289	7,382	9,500	5,907	-3,789	2,118
Yukon	-2,381	-2,775	-2,660	394	-279	115
N.W.T.	-345	-366	-755	21	-410	-389
1986-1991						
Nfld.	-12,238	-13,468	-13,960	1,230	-1,722	-492
P.E.I.	-1,192	-122	-855	-1,070	337	-733
N.S.	-2,948	-1,672	-4,870	-1,276	-1,922	-3,198
N.B.	-2,147	-3,693	-6,070	1,546	-3,923	-2,377
Que.	-31,839	-39,366	-25,550	7,527	6,289	13,816
Ont.	35,616	70,543	46,955	-34,927	11,339	-23,588
Man.	-29,905	-35,823	-35,245	5,918	-5,340	578
Sask.	-53,045	-65,941	-60,350	12,896	-7,305	5,591
Alta.	-19,734	-40,237	-25,015	20,503	-5,281	15,222
B.C.	119,581	132,373	125,880	-12,792	6,299	-6,493
Yukon	747	1,094	780	-347	33	-314
N.W.T.	-2,896	-3,688	-1,700	792	1,196	1,988

Source: Population Estimates Section, Demography Division, Statistics Canada.
1991 Census of Canada, *Mobility and Migration*. Catalogue No. 93-322, Table 2A.

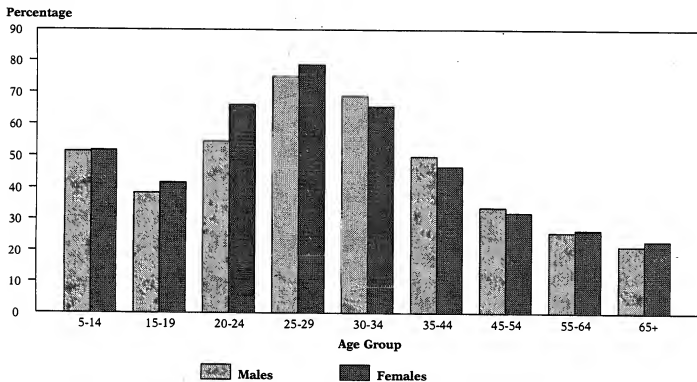
(d) Evaluation of Age-Sex Specific Patterns

Age-sex specific mobility and migration rates are plotted in Figures 3A and 3B, respectively, for 1991 Census data. The pattern of age-sex specific rates is similar to that of earlier censuses, in which persons aged 25-29 are the most mobile, after which mobility declines with increasing age until the retirement years.

• Sex Differentials

Census data for 1991, as well as for earlier censuses, indicate that during the early adult years (15-19, 20-24), females tend to be more mobile than males. In 1991, two-thirds of the females aged 20-24 had moved over the past five years compared to just over half of the males of the same age (see Figure 3A). At the next age group, 25-29, the percentages moved of males and of females were similar, at 79% among females and 75% among males. However, the sex differential, while pronounced for intraprovincial migration, tends to disappear in the case of interprovincial migration, as was the situation with 1986 Census data, with males and females aged 20-24 being equally mobile. Census data from 1991 indicated that, for the 20-24 age group, females moved among provinces to a slightly greater extent than did males.

These sex differentials in mobility observed for 1991 generally appear to be valid, and comparable with those of earlier censuses, with the possible exception of interprovincial migration. It is usually thought that the greater mobility of women during the early adult years may be related to the formation of unions through marriage and cohabitation, which tend to occur at younger ages for females. However, the user should also be aware of the possible contributing effect of differential undercoverage between males and females.

Figure 3A. Movers as A Percentage of Population by Selected Age Group and Sex: Canada, 1986-1991**Figure 3B. Migrants as A Percentage of Population by Selected Age Group and Sex: Canada, 1986-1991**

- **Impact of Differential Undercoverage**

The impact of high undercoverage rates in the 20-24 age group, and of their differences for males and females, should be considered. In 1991, the 20-24 age group had the highest undercoverage rate, at 7.0%. Rates for males and females in this group were 7.8% and 6.3%, respectively (see Statistics Canada, **Coverage**, 1994). In 1986, the difference was more pronounced, at 10.7% and 7.3% respectively. In 1981, differences in undercoverage rates between males and females aged 20-24 were less pronounced, at 6.0% and 5.0%, respectively. Perhaps the greater sex differential in undercoverage rates in 1986 could be a contributing factor towards the high mobility of females aged 20-24, particularly in the case of interprovincial migration. (One should note that the coverage rates for the 1991 Census are not exactly comparable with those for earlier censuses, because: (1) the rates for 1991 are net undercoverage rates, while those for 1986 and 1981 are gross undercoverage rates; and (2) the rates for 1991 include non-permanent residents, who have much higher undercoverage rates.)

(e) Rural/Urban Place of Residence (RUUB5)

- **Assignment of Rural/Urban Classification**

As indicated in Section V, respondents who reported CSDs which had mixed rural/urban population components as their place of residence 5 years ago were proportionally assigned rural/urban place of residence 5 years ago (RUUB5) on the basis of the current (1991) rural/urban population size of the CSD. In 1991, out of 6,006 CSDs in Canada, there were 423 CSDs which had mixed rural/urban population components. These mixed CSDs were verified to ensure that the resulting proportional rural/urban classification of respondents for "5 years ago" corresponded to the CSDs current rural/urban composition of the population. Comparisons between RUUB5 and the current rural/urban ratio of each mixed CSD indicated that the variable on rural/urban place of residence was reasonably derived. Only 9 of these mixed CSDs showed a difference of 10 percentage points or more, with a processing bias in favour of rural. However, the populations are small and distributed among several provinces, such that the net effect can be considered insignificant.

- **Comparison among 1981, 1986 and 1991 Data**

Comparisons between 1981 and 1986, and between 1986 and 1991 census data on rural/urban migration, indicate similar patterns of origin-destination flows and of net gains/losses in rural areas by age groups. Table 14 shows that the flow of migrants from urban to rural areas was larger than the flow in the opposite direction, resulting in a net inflow of migrants to rural areas for both periods. While the net gains and losses were reduced in 1986, they were elevated in 1991.

Table 14. Rural/Urban Migration: Canada, 1976-1981, 1981-1986 and 1986-1991

		1981 Place of Residence		
1976 Place of Residence	1976-1981	Urban	Rural	Total Out-migration
	Urban	2,785,800	863,075	3,648,875
	Rural	607,320	256,065	863,385
	Total in-migration	3,393,120	1,119,140	4,512,260
	Net (urban-rural)	-255,755	255,755	
		1986 Place of Residence		
1981 Place of Residence	1981-1986	Urban	Rural	Total Out-migration
	Urban	2,488,260	702,085	3,190,345
	Rural	624,730	234,875	859,605
	Total in-migration	3,112,990	936,960	4,049,950
	Net (urban-rural)	-77,355	77,355	
		1991 Place of Residence		
1986 Place of Residence	1986-1991	Urban	Rural	Total Out-migration
	Urban	3,099,430	924,060	4,023,490
	Rural	634,595	289,560	924,155
	Total in-migration	3,734,025	1,213,620	4,947,645
	Net (urban-rural)	-289,465	289,465	

Sources: 1981 Census of Canada, *Population, Mobility Status*, Table 7, Catalogue No. 92-907.

1986 Census of Canada, unpublished data.

1991 Census of Canada, unpublished data.

2. Quality of Mobility 5-year Interval Data for Small Areas

Mobility data, like most population data, are subject to undercounting, respondent misreporting and processing error. The impact of these errors at the national and provincial levels is generally not significant. However, the user should exercise caution when analyzing mobility data at the sub-provincial level, particularly at the CSD level.

(a) CSD-level Migration (PCSD, PCSD5)

In 1988, a study was launched to evaluate the 1986 Census data on mobility. The findings were reported in an unpublished study prepared by J.A. Norland of the Demography Division in February, 1989. The study provided a comprehensive evaluation of the quality of mobility data at the small area level. Following is a list of some of the study's principal findings and recommendations to users of mobility data at the CSD and CD levels. Users should note that these findings relate to mobility variables at the CSD and CD level (PCSD, PCSD5, PCD, PCD5). For more detailed information, see User's Guide to 1986 Census Data on Mobility.

(b) Principal Findings Concerning CSD/CD-level Migration Data

- Migration Rates for “Small CSDs” Unreliable
- Significant number of larger CSDs have excessive out-migration rates
- Special problems involve data for “duplicate name places”, e.g., Barrie, for which there exist the township of Barrie/Frontenac County and the city of Barrie/Simcoe County. Data for some “duplicate name places” have been found to be afflicted with serious errors. (See Section on Automated Coding, especially on “pseudo-codes” for how this problem was tackled.)
- Similarly, selected CSDs within CMAs were deemed to involve considerable error; a prime example being Victoria and Saanich.
- There are indications that the combination of respondent error and processing error is responsible for the distortion of CSD migration rates based on analysis of CSDs in Duplicate Name Places and CMAs.
- Boundary Changes Not Significant in “Suspect” Migration Rates
- Mobility data for selected CDs may also contain considerable error, probably stemming from a general undercount of internal migrants in the census: the smaller CDs, in particular, should be examined carefully. The general undercount of internal migration is probably due to a combination of respondent error and undercoverage.

(c) Recommendations for Users Concerning CSD/CD-level Migration Data

Recommendation 1 – Refer to Areas with Large Base Populations.

The large number of “suspect” migration rates for CSDs with base populations below 250, together with considerations based on sampling and confidence intervals, constitute three arguments which justify using 250 as the minimal cut-off point for base populations that are “too small”. A higher cut-off point for CSDs, say at the population level of 500, should not be ruled out, even though this limit would delete 1,000 more CSDs than does the 250 cut-off point. As for CDs, there seems to be little gain in segregating the ones with small base populations (say, the 13 CDs with 1986 base populations between 1,000 and 10,000). Generally, the user is advised to use discretion in defining areas having “small base populations”, and to apply as a guide the three considerations outlined above with regard to CSDs.

Recommendation 2 – Beware of “Special Situations”.

Users working with small-area data are urged to draw on our findings as well as on their own field knowledge to assess whether the small-area data under question are likely to be affected by such problems as duplicate names and boundary changes. Excessively high and low mobility rates may serve as an indicator but not as a foolproof guide. On the one hand, a given area (say a CD with a duplicate-name CSD within it) may not be affected to the point of generating a “suspect” mobility rate even though the mobility data are distorted. On the other hand, small areas may be subject to genuine demographic trends which generate “suspect” mobility rates, as in the case of areas undergoing rapid urban development – a recurring “special situation”. Distinguishing between distorted and genuine mobility rates, when the group of “suspect” rates is considered, must be based on the analyst’s field knowledge as well as on findings from studies such as the one reported here.

Finally, data users should be aware that the census mobility data are subject to: (i) distortions of the matrix showing migrants’ place of origin and destination; and (ii) undercounting [of migrants]. One should bear in mind that these are two distinct types of error and that their impact may differ from one set of spatial categories (say, CSDs) to the next (say, provinces).

Further details of these findings and recommendations are provided in the report by J.A. Norland.

Also, there is some evidence to suggest that there is an undercount of migrants in the census, stemming largely from respondent error; in addition to undercoverage. However, the factors contributing to this suspected undercount in 1986 are also present in earlier censuses, and it is difficult to know to what extent this type of undercounting varies from census to census.

In general, users should assume that the problems identified in the evaluation of mobility data at the CSD and CD level are not unique to the 1986 Census. Factors contributing to these data quality problems existed in earlier censuses. In 1991 attempts have been made to eliminate or reduce many of these problems during the stages of Automated Coding and the Edit and Imputation (see Section IV. Data Assimilation).

(d) CMA/CA Level Migration Data (CMA, CMA5)

Data at the CMA/CA level are considered more reliable since they are much less subject to the same type of misreporting and processing problems that afflict CSD-level data. Origin-destination flows and levels of in-, out- and net migration at the CMA/CA level appear reasonable for 1991 Census. Generally, CMA/CA level patterns of gain and loss by migration tend to reflect those observed in interprovincial migration, with a few exceptions such as Toronto, where the majority of its population loss went to other areas in the same province, i.e., Ontario (see Table 15).

However, the user is cautioned that analysis of migration patterns within CMA/CAs is problematic owing to data quality problems of CSDs within CMAs.

Table 15. In-, Out- and Net Migration: Census Metropolitan Areas, 1981-1986 and 1986-1991

Census Metropolitan Area	1986 Census ¹ 1981-1986			1991 Census ² 1986-1991		
	In-migration	Out-migration	Net Migration	In-migration	Out-migration	Net Migration
Calgary	104,065	110,165	-6,100	106,620	103,515	-19,155
Chicoutimi-Jonquière	9,990	15,890	-5,900	11,160	15,185	-4,025
Edmonton	97,285	112,830	-15,545	97,325	109,065	-11,740
Halifax	42,920	35,860	7,060	43,830	43,075	755
Hamilton	48,710	43,810	4,900	58,220	54,440	3,780
Kitchener	39,345	29,350	9,995	51,085	41,090	9,995
London	44,580	42,605	1,975	50,180	44,500	5,680
Montréal	181,120	163,350	17,770	164,770	194,500	-29,730
Oshawa	32,000	25,460	6,540	46,860	31,000	15,860
Ottawa-Hull	107,675	72,850	34,825	109,555	84,545	25,010
Québec	49,700	47,025	2,675	59,250	50,395	8,855
Regina	26,200	24,800	1,400	25,065	32,850	-7,785
Saskatoon	34,525	26,830	7,695	31,470	41,910	-10,440
Sherbrooke	15,765	15,795	-30	17,960	18,125	-165
St. Catharines-Niagara	23,505	28,775	-5,270	31,585	24,645	6,940
St. John's (Nfld.)	15,190	15,000	190	18,005	16,370	1,635
Saint John (N.B.)	10,055	10,820	-765	11,095	11,700	-605
Sudbury	11,535	19,675	-8,140	18,865	16,235	2,630
Thunder Bay	10,855	10,260	595	10,165	13,555	-3,390
Toronto	264,770	184,495	80,275	212,445	327,435	-114,990
Trois-Rivières	12,415	15,675	-3,260	15,020	13,445	1,575
Vancouver	135,235	102,095	33,140	165,620	125,700	39,920
Victoria	41,110	33,335	7,775	54,330	34,800	19,530
Windsor	16,985	19,085	-2,100	16,280	21,880	-5,600
Winnipeg	57,050	52,295	4,755	50,190	69,345	-19,155

(1) Based on 1986 CMA boundaries

(2) Based on 1991 CMA boundaries

Sources: 1986 Census of Canada, *Census Metropolitan Areas*. Catalogue No. 93-156, Table 13.1991 Census of Canada, *Mobility and Migration*. Catalogue No. 93-322, Table 2C.**3. Mobility 1-year Interval Data at National and Provincial/Territorial Levels**

Prior to their release, census data on mobility were evaluated for purposes of certification. Evaluation of one-year interval mobility data consisted of comparisons with other data sources, particularly estimates of annual interprovincial migration produced by the Estimates Section of the Demography Division. Because the question on the place of residence one year ago was asked for the first time in the 1991 Census, comparisons with past censuses are not possible.

Overall, the quality of 1991 mobility data at the provincial/territorial and national levels is good. Patterns of in-, out- and net interprovincial migration are consistent with those produced from annual estimates for the 1990-91 period.

While the overall quality of mobility data appears reasonable at the national and provincial/territorial levels, there are some indications that there may be a general undercount of the volume of migrants due to respondent error and/or misunderstanding.

a. Mobility Status (MOB1)**(i) Non-response and Partial Response**

The rate of non-response (blanks, including responses that cannot be coded) for mobility status was 1.3%, and the percentage of partial and multiple responses (invalids) was 0.4%. As in the 5-year interval data, the population of youths and young adults had the highest percentage of blanks and invalids in 1991, at 1.8% for the 15-19 age group and 1.5% for the 20-34 group. Geographically, the percentage of blanks and invalids was highest in the Territories (as in five-year interval data), at 5.7% for the Yukon, and 2.5% for the Northwest Territories for 1991. In general, rates of non-response and partials were somewhat lower in the one-interval data than in the five-year interval data, as well as the overall rate of 1.3% vs. 5.5% for the five-year interval data. Rates of invalid responses and non-responses for the 1991 Census by age groups, for Canada, Provinces and Territories, are provided in Table 16.

Table 16. Invalid-response and Non-response Rates of Population 15 Years and Over for Mobility Status by Selected Age Groups: Canada, Provinces and Territories, 1990-1991

Area	Age 15+	Age 15-19	Age 20-34	Age 35-64	Age 65+
Canada	1.3	1.8	1.5	1.0	1.3
Invalid	0.4	0.4	0.5	0.4	0.5
Non-response	0.8	1.4	1.0	0.7	0.8
Nfld.	0.8	1.2	0.9	0.6	1.0
Invalid	0.3	0.2	0.2	0.2	0.5
Non-response	0.6	1.0	0.7	0.4	0.5
P.E.I.	0.8	1.7	0.8	0.6	0.7
Invalid	0.1	0.1	0.1	0.1	0.2
Non-response	0.7	1.6	0.7	0.5	0.5
N.S.	0.9	1.4	1.0	0.7	0.9
Invalid	0.2	0.2	0.2	0.2	0.2
Non-response	0.7	1.3	0.8	0.5	0.7
N.B.	0.8	1.1	1.0	0.6	1.0
Invalid	0.2	0.1	0.2	0.1	0.3
Non-response	0.7	1.0	0.8	0.4	0.7
Que.	0.9	1.3	0.9	0.8	0.5
Invalid	0.2	0.1	0.2	0.2	0.3
Non-response	0.7	1.2	0.8	0.6	0.3
Ont.	1.5	2.0	1.8	1.2	1.3
Invalid	0.6	0.5	0.7	0.5	0.6
Non-response	0.9	1.6	1.1	0.7	0.8
Man.	1.4	1.7	1.8	1.2	1.4
Invalid	0.7	0.5	0.9	0.6	0.7
Non-response	0.7	1.2	0.9	0.6	0.6
Sask.	1.2	1.7	1.4	1.0	1.4
Invalid	0.7	0.7	0.8	0.6	0.9
Non-response	0.6	1.1	0.7	0.4	0.5
Alta.	1.4	1.9	1.6	1.2	1.5
Invalid	0.7	0.6	0.9	0.6	0.9
Non-response	0.7	1.2	0.8	0.5	0.7
B.C.	1.5	2.2	1.8	1.2	1.3
Invalid	0.3	0.3	0.3	0.2	0.4
Non-response	1.2	1.9	1.4	1.0	0.9
Yukon	5.7	7.2	5.8	5.0	9.0
Invalid	0.8	0.8	1.1	0.6	0.3
Non-response	4.9	6.4	4.7	4.4	8.7
N.W.T.	2.5	4.3	2.4	2.1	1.9
Invalid	0.5	0.3	0.5	0.6	0.3
Non-response	2.0	4.0	1.9	1.5	1.6

Source: 1991 Census of Canada, unpublished tabulations.

(ii) Distributions

Both the unedited and edited distributions of the mobility status variable yield similar results, with the same variations in mobility by age groups and provinces/territories. As indicated in Section V, the change in distribution due to imputation was not significant. Differences are largely related to the inclusion of the population aged 1-14 in the edited data, for which mobility status is imputed.

Both the unedited and edited distributions show that mobility peaks in the 20-24 age group. This age group has the highest proportions of movers (34.7% based on the edited data) and internal migrants (33.1% based on the edited data). See Table 17 for 1991 distributions of population by mobility status, for selected age groups and sex (based on edited data). External migrants were a small portion of each of total 20-24 and 25-29 age groups, although proportions of these two age groups were the highest among external migrants.

Table 17. Distribution of Population 1 Year and Over by Age Groups and Sex, Showing Mobility Status: Canada, 1991 Census

Age and Sex	% Non-movers	% Movers	% Intraprovincial Migrants	% Interprovincial Migrants	% External Migrants
1 +	83.7	16.4	14.3	1.2	0.9
Males	83.5	16.5	14.4	1.3	0.9
Females	83.8	16.2	14.1	1.2	0.9
1 - 14	84.1	15.9	13.9	1.2	0.8
Males	84.0	16.0	14.0	1.2	0.9
Females	84.1	15.9	13.9	1.2	0.8
15 - 19	84.2	15.8	13.5	1.2	1.1
Males	86.0	14.0	11.8	1.2	1.1
Females	82.4	17.6	15.3	1.3	1.1
20 - 24	65.3	34.7	30.4	2.7	1.5
Males	68.2	31.9	27.7	2.8	1.4
Females	62.5	37.5	33.1	2.7	1.7
25 - 29	67.3	32.7	28.8	2.4	1.6
Males	66.1	33.9	29.9	2.5	1.5
Females	68.5	31.6	27.7	2.2	1.7
30 - 34	78.1	22.0	19.1	1.6	1.2
Males	76.8	23.3	20.3	1.7	1.2
Females	79.3	20.7	17.9	1.5	1.2
35 - 44	86.1	14.0	12.1	1.1	0.9
Males	85.3	14.7	12.7	1.1	0.9
Females	86.7	13.3	11.4	1.0	0.9
45 - 54	90.9	9.2	8.0	0.6	0.5
Males	90.6	9.4	8.1	0.7	0.6
Females	91.1	8.9	7.8	0.6	0.5
55 - 64	93.0	7.0	6.0	0.5	0.5
Males	93.2	6.9	5.9	0.5	0.4
Females	92.9	7.1	6.1	0.5	0.5
65 +	94.2	5.8	5.1	0.4	0.3
Males	94.5	5.5	4.8	0.3	0.3
Females	94.0	6.0	5.3	0.4	0.3

Source: 1991 Census of Canada, unpublished tabulations.

b. Interprovincial Migration (PR, PR1)

The evaluation of provincial migration patterns involved a comparison of the one-year data on in-, out- and net migration with estimates of annual interprovincial migration as well as with the five-year data from the 1991 Census. Estimates which are produced by the Estimates Section of the Demography Division are based on two sources of administrative data: Family Allowance records and Income Tax files. There are some limitations in comparing the two sets of data (census and estimates), since:

- (1) census data on migration exclude the population aged 0;
- (2) census data are imputed for the population aged 1-14; and,
- (3) census data are based on place of residence 1 year ago and, therefore, exclude return and multiple migrants, as well as any migrants who died over the 1-year period.

These limitations will affect comparability more for the volume of interprovincial migration than for patterns of in-, out- and net migration.

(1) Volume of Interprovincial Migration

Because of the differences between the census data and the estimates, the number of interprovincial migrants from the census data was expected to be less than the estimated number of interprovincial migrants. However, the total number of interprovincial migrants from the census data was slightly higher than the estimates from the Income Tax files (319,195 versus 316,567), while census data yielded a somewhat lower figure than the Family Allowance data (387,940).

(2) Distributions of In- and Out-migrants

(2) Distributions of In- and Out-migrants Data from estimates (both Family Allowance and Income Tax) confirm the 1991 distributions of in- and out-migrants (see Table 18). Census distributions are similar to those of both Income Tax- and Family Allowance-based estimates.

Table 18. Distribution of Annual Estimates of Provincial In- and Out-migrants, Canada, 1990-1991

Provinces	Family Allowance	Income Tax	Census 1990-1991	Census 1986-1991
	%	%	%	%
In-migrants				
Nfld.	2.8	3.3	3.3	2.1
P.E.I.	0.9	0.9	0.8	0.9
N.S.	5.7	5.8	5.7	5.5
N.B.	4.2	4.3	4.1	3.7
Que.	8.1	8.0	8.6	8.4
Ont.	23.7	23.0	21.3	27.6
Man.	5.2	5.2	5.2	4.5
Sask.	5.5	5.2	5.4	3.9
Alta.	19.6	19.7	19.7	17.4
B.C.	22.8	22.9	24.1	24.4
Yukon	0.7	0.7	0.6	0.7
N.W.T.	1.1	1.1	1.1	1.0
Out-migrants				
Nfld.	3.7	3.5	3.3	3.6
P.E.I.	1.1	1.0	0.9	1.0
N.S.	5.9	5.8	5.7	6.0
N.B.	4.3	4.1	4.0	4.3
Que.	11.3	11.5	11.1	11.0
Ont.	26.2	26.7	28.1	22.8
Man.	7.3	7.6	6.7	8.1
Sask.	8.7	9.0	8.5	10.1
Alta.	17.5	16.9	17.4	20.0
B.C.	12.3	12.1	12.4	11.5
Yukon	0.6	0.6	0.6	0.6
N.W.T.	1.2	1.1	1.3	1.2
Total Provincial Migrants	387,940	316,567	319,195	977,050

Source: Population Estimates Section, Demography Division, Statistics Canada.
1991 Census of Population, *Mobility and Migration*, Cat. No. 93-322, Tables 2A and 2B.

d. Evaluation of Age-Sex Specific Patterns

Age-sex specific mobility and migration rates from 1-year interval data are plotted in Figures 4A and 4B, respectively, for 1991 Census data. The pattern of age-sex specific rates is similar to that of the 5-year interval data, with one exception. While persons aged 25-29 are the most mobile according to 5-year interval data, after which mobility declines with increasing age until the retirement years, persons aged 20-24 are the most mobile according to 1-year interval data.

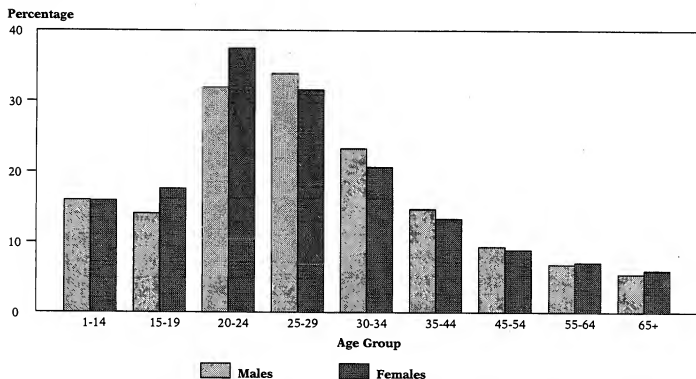
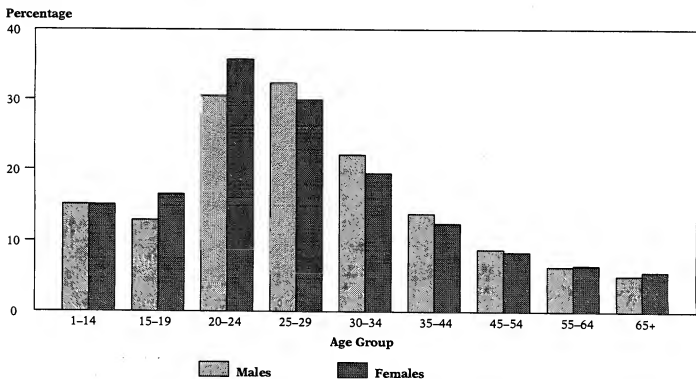
• Sex differentials

Census data for 1991 indicate that in the age group 20-24, females tend to be more mobile than males. In 1991, 37.5% of females aged 20-24 had moved over the past year, compared to just 31.9% of males of the same age (see Figure 4A). This age group was the peak for females. However, the peak appeared at the 25-29 age group among males, and for this age group, the proportion of movers is greater among males than among females, at 33.9% and 31.6% respectively. The sex differentials, while pronounced for intraprovincial migration, tend to disappear in the case of interprovincial migration, as was the situation with 1981 and 1986 Census data, with males and females aged 20-24 or 25-29 being equally mobile.

These sex differentials in mobility observed for 1991 generally appear to be valid, with the possible exception of interprovincial migration. It is usually thought that the greater mobility of women during the early adult years may be related to the formation of unions through marriage and cohabitation, which tend to occur at younger ages for females. However, the user should also be aware of the possible contributing effect of differential undercoverage between males and females.

- **Impact of Differential Undercoverage**

The impact of high undercoverage rates in the 20-24 age group, and their differences for males and females, should be considered. In 1991, the 20-24 age group had the highest undercoverage rate, at 7.0%. Rates for males and females in this group were 7.8% and 6.3% respectively (see Statistics Canada, **Coverage**, 1994). Perhaps the greater sex differential in undercoverage rates in 1991 could be a contributing factor towards the high mobility of females aged 20-24, particularly in the case of interprovincial migration.

Figure 4A. Movers as a Percentage of Population by Selected Age Group and Sex: Canada, 1990-1991**Figure 4B. Migrants as a Percentage of Population by Selected Age Group and Sex: Canada, 1990-1991**

VII. Historical Comparability

A. Introduction

To use census data fully, we must not only analyze the historical trends of the data we are presenting, but also the historical changes in what information is desired and how it is collected. In the past, the census of Canada has undergone continuing change to meet Canadians' ever-changing needs for timely and accurate information on Canada's statistical profile. This versatile perspective has endured in 1991.

The census questionnaire was completely redesigned for the 1991 Census. The following changes were made since the 1986 Census:

- Twelve (12) questions not asked during the 1986 Census appear on the 1991 Census questionnaire;
- Of the twelve (12) questions, seven (7) appeared for the first time and five (5) were reinstated from previous censuses;
- Four (4) questions found on the 1986 Census questionnaire were excluded from the 1991 questionnaire;
- Two (2) new census questionnaires were added in 1991 (Form 2D – Canvasser Questionnaire, and Form 3B – Soup Kitchen Questionnaire).

Form 2D was introduced to enumerate remote northern areas and Indian reserves. It contained the same questions as the Form 2B but was designed to be administered in a person-to-person environment. Form 3B, an experimental pilot questionnaire, consisted of eleven (11) questions. Interviews were conducted on a person-to-person basis in a sample of soup kitchens in major Canadian cities to enumerate homeless people not counted by traditional enumeration techniques.

For the first time since 1941, both **permanent and non-permanent residents** of Canada were enumerated. A growing segment of Canada's population, non-permanent residents can create a demand for government services such as schooling, language training, health care, and employment programs. Users should be careful when comparing data from 1991 and previous censuses.

B. Mobility and Migration Data

In the 1976 User's Guide on Mobility Data, a detailed discussion was provided on the historical comparability of the mobility status question from 1941 to 1976. The User's Guide to 1986 Census Data on Mobility discussed the comparability of the 1986 data with the 1976 and 1981 Censuses. The present report concentrates on the comparability of the 1991 data with the 1986 Census, while a few important points of the previous review are briefly discussed. Both conceptual and collection/processing changes affecting the historical comparability of mobility data are examined.

1. Conceptual Changes

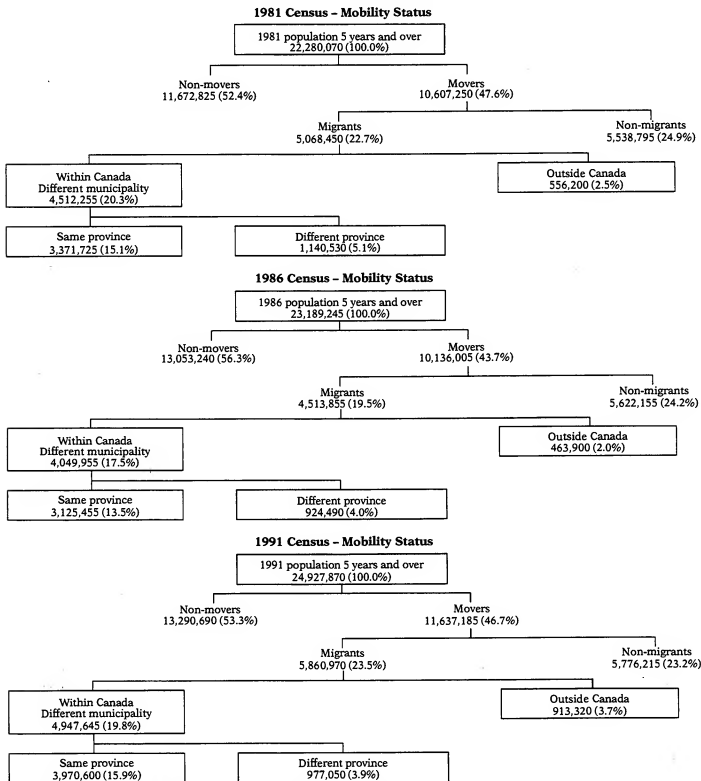
Conceptually, the mobility status question has not differed significantly since the 1946 Census of the Prairie Provinces. For the censuses of Canada, the question has been comparable from 1961 on. For all censuses from 1946 on, the mobility status question has been based on a five-year reference interval and the CSD of residence. In 1941, respondents were asked the number of years of continuous residence in the same municipality and in the same province, and to state the province or country of last permanent residence. Although a filter question was introduced in the 1991 Census, the conceptual framework remains the same.

A comparison of the mobility status of the Canadian population (5 years of age and over) between the 1981, 1986 and 1991 Censuses is provided in Figure 5. Mobility status based on previous censuses, from 1941 to 1976, is compared in Figure 6. This latter comparison, which is reproduced from the 1976 User's Guide, shows the comparison of earlier censuses in terms of the 1976 publication structure. From 1976 on, the primary classification

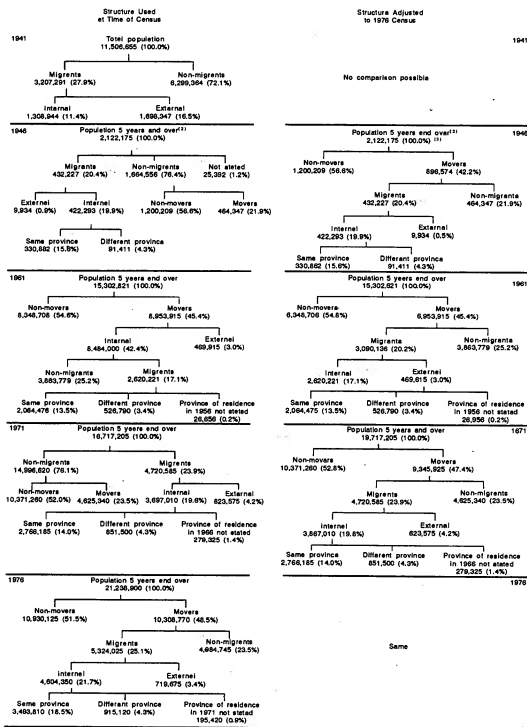
of the population was made on the basis of mobility status (movers, non-movers) while in some of the earlier censuses, the primary classification was based on migration status (migrants, non-migrants). These two sets of comparisons illustrate the conceptual comparability of the mobility variable across censuses.

Although the basic concept of the mobility variable has not changed significantly among the censuses, there have been changes in related factors which users should be aware of when analyzing mobility data. It should be noted that the following section is an update of the 1986 User's Guide.

Figure 5. Mobility Status of the Population 5 Years and Over, Canada, 1981-1991



Source: The Nation: *Mobility Status and Interprovincial Migration*, 1986 Census of Canada, Catalogue 93-108 and *Mobility and Migration*, 1991 Census of Canada, Catalogue 93-322, Statistics Canada.

Figure 6. Comparison of Residential Mobility Status Structures, 1941-1976⁽¹⁾

- (1) The basic structural change relates to whether primary classification of the population was made on the basis of migration status (migrants, non-migrants) or mobility status (movers, non-movers). In the 1941, 1946 and 1971 Censuses, the primary classification was on the basis of migration status, while in 1961 and 1976 it was on the basis of mobility status.
- (2) Includes persons who did not state their mobility status or place of residence in 1941.
- Source: 1941 Census of Canada, General Review, Vol. 1, p. 45.
1946 Census of the Prairie Provinces, Population, Vol. 1, p. XXXV.
1961 Census of Canada, Population Sample, Vol. 41, Sub. 4.1.9, Table 12, p. 1.
1971 Census of Canada, Population, Vol. 1.3, Sub. 1.3.7, p. 1.
1976 Census of Canada, Population, Demographic Characteristics, Vol. 2, Sub. 2.2, Chart 7.

Source: Reproduced from "A User's Guide to 1976 Census Data on Mobility Status", by H.A. Puderer, Statistics Canada, May 1980.

2. Factors Affecting Conceptual Comparability

A number of factors affect historical comparability of mobility data in relation to the conceptual framework. The major areas in which changes have occurred are: coverage, question content, user guidelines for self-enumeration, and geographic framework.

a. Changes in Coverage and Universe:

- Since 1961, the mobility question has been asked of the population aged 15 or over; in 1946 the question was asked of persons aged 5 or over; and in 1941 of persons of all ages.
- In 1946, only the Prairie Provinces were covered in the census; in all other censuses (1941 and from 1961 on), data were collected for all of Canada. Newfoundland was not included in the census of Canada until 1951, following union with Canada in 1949. In 1961 and 1971, data were not provided separately for each of the territories.
- From 1961 on, the universe for mobility status has included the population 5 years and over, with exclusions which have varied from census to census. In 1961, mobility status was reported for the population aged 5 years and over residing in private households, excluding residents in collectives, temporary residents, overseas military and government personnel and their families, and persons located after the regular census through a postal check or re-enumeration. In 1971 and 1976, the universes of "population 5 years and over" excluded Canadian residents stationed abroad in the Armed Forces or the diplomatic services. In 1941, the universe included the total population, with no exclusions, while in 1946 the universe was the population 5 years and over whose usual residence was in Manitoba, Saskatchewan or Alberta. (Puderer, 1980, pp. 41 and 46).
- In both 1981 and 1986, the mobility universe comprised the population 5 years of age and over residing in Canada, excluding institutional residents. This is in contrast to 1971 and 1976 data, which did include institutional residents. In 1991, the mobility universe excluded all persons in collective households, but includes non-permanent residents in Canada. As Table 19 shows, non-permanent residents were 0.8% of the population in each of the mobility universes. Among this category, 76.0% were external migrants for the mobility 5-year interval data and 23.9% were external migrants for the mobility 1-year interval data. For the one-year mobility data, exactly half of the non-permanent residents were non-movers.

Table 19. Population in Mobility Universe by Category of Population, Showing Mobility Status: Canada, 1991 Census

Category of Population	Total	Non-movers	Movers (Same CSD / Same Province)	Internal Migrants	External Migrants
Population 5 Years and Over (Mobility: 5 Years, 1986-1991)					
Total	24,627,870	13,290,685	5,776,215	4,947,650	913,320
Non-immigrant Population	20,419,660	11,149,440	4,870,305	4,303,625	96,285
Immigrant Population	4,296,600	2,120,225	886,750	633,495	656,130
Non-permanent Residents	211,610	21,020	19,160	10,530	160,905
Population 1 Year and Over (Mobility: 1 Year, 1990-1991)					
Total	26,430,895	22,108,675	3,767,625	319,195	235,400
Non-immigrant Population	21,884,130	18,396,650	3,171,195	275,650	40,640
Immigrant Population	4,327,675	3,602,675	542,610	39,940	142,450
Non-permanent Residents	219,090	109,350	53,820	3,610	52,305

Source: 1991 Census of Canada, unpublished tabulations.

b. Changes in question content:

- In both the 1941 and 1946 Censuses, respondents were asked to report their country of prior residence. Since 1961, the previous country of residence was not collected for respondents indicating a place of residence outside Canada five years earlier. In the 1991 Census, this question was reintroduced.
- From 1971 on, internal migrants were asked to specify their CSD of residence five years ago, whereas in previous censuses migrants were also asked whether or not their earlier residence was a farm.
- A question on the number of intermunicipal moves was asked only in 1971.
- In 1986 and 1991, emphasis was placed on ensuring that Indian reserves were accurately reported in mobility categories. In 1986, the answer categories referred to "city, town, village, township, other municipality or Indian reserve" compared to "city, town, village, borough or municipality" in 1981 and "city, town, village, municipality" in 1971 and 1976.
- Instructions in the question referring to write-ins of place names were the same in 1971 and 1976, but they were expanded in 1981 to include examples. The 1981 instruction was repeated in 1986 and in 1991.

c. Changes in Self-enumeration Guidelines

Changes in Self-enumeration Guidelines Although census guidelines in the instruction booklets of census guides for self-enumeration since 1971 varied among the censuses, these guidelines did not differ significantly in content. For all five censuses from 1971 to 1991, respondents were instructed in the census guide to distinguish between CSD types where applicable, e.g., between city and township. In 1971 and 1976, respondents were also instructed to distinguish between suburban municipalities and large urban areas, while in 1981 and 1986, these instructions appeared directly on the questionnaire and were, therefore, not included in the respective census guides. In the 1991

Census, these instructions were included in both the questionnaire and the guide. As well, in the 1971 and 1976 instruction booklets, respondents were reminded that the intent of the question was to measure actual movements of population, not simply changes in address due to boundary or name changes, and to report residence 5 years ago in terms of present municipal boundaries. Although this particular instruction did not appear in the census guides in 1981 and 1986, it was included as an additional guideline in the "Telephone Assistance Service" supplementary reference manual, to deal with inquiries from householders.

The only other difference among the five census booklets/ guides lies with the 1971 Census guide, which contained an additional mobility guideline concerning the "number of moves" question.

Information on "why we ask this question" was provided to census representatives (CRs) and Telephone Assistance Service staff in census content manuals from 1976 on, and directly to respondents for the first time in the 1986 guide and in the 1991 guide.

d. Changes in Geographic Framework

Comparability of mobility data over the censuses has been affected by both conceptual changes in geography (such as definitions of rural, urban, farm, non-farm, and metropolitan areas) and changes in CSD, CD, CMA and CA boundaries. Because the number of census geographic areas (e.g., CSDs, CMAs, etc.) and their boundaries change from census to census, the user must exercise caution when using mobility data over two or more censuses. For example, in 1986 there were 6,009 CSDs, 114 CAs and 25 CMAs compared to 5,710 CSDs, 88 CAs and 24 CMAs in 1981. The numbers had not been changed much in 1991, with 6,006 CSDs, 115 CAs and 25 CMAs. Changes in population size, geographic concepts, definitions and boundaries can affect census geography from one census to the next.² To illustrate, modifications made to delineation criteria for CAs since 1981 (e.g., regarding commuting flows and CSD components) affected the number of CAs in the program for 1986. Details of changes affecting the historical comparability of census geography from 1961 to 1986, as well as definitions and descriptions of available maps, are covered in a variety of census products including the *1986 Census Dictionary* (Cat. No. 99-101), *1986 Census Products and Services* – Final Edition (Cat. No. 99-103), *CMAs/CAs: A 1986-1981 Comparison* (Cat. No. 99-105) and *1986 Census Geography: A Historical Comparison* (Cat. No. 99-106).

A brief summary of the census geographic hierarchy and definitions of geostatistical areas is provided in Appendix C.

The 1976 User's Guide on Mobility provides details of the conceptual changes which took place over the censuses from 1941 to 1976 with respect to the definitions of rural/urban, rural farm and non-farm, and metropolitan areas. Comparability of rural/urban and farm/non-farm data was also affected by the fact that such migration data were collected directly from the respondent prior to 1971, whereas rural/urban and farm/non-farm places of residence 5 years ago were derived through processing in 1971 and 1976.

As an example of changes in the geographic framework, frequency counts of selected geostatistical areas (e.g., CSDs, CDs, CAs and CMAs) are compiled for selected censuses from 1941 to 1991, to illustrate the impact on the historical comparability of mobility and migration data (Table 20). For example, the changing number and boundaries of CSDs from one census to another will to some extent affect the comparability of the measure of "migrants" across censuses (since the volume of migrants is partly a function of the number and size of CSDs).

Because of changes in geographic areas between censuses, places of residence 5 years ago must reflect the boundaries of the census in question in order to maintain geographic consistency between current and previous place of residence. For example, when 1991 data on usual place of residence 5 years ago by current place of residence is tabulated, all areas reflect 1991 boundaries, even when referred to as places of residence in 1986.

² Since 1986, a new geographic concept was introduced to the census, that of the primary census metropolitan area (PCMA) and the primary census agglomeration (PCA) (see Appendix C for definitions).

Table 20. Comparison of Frequency of Selected Geostatistical Units for Census Years, 1941 to 1991

Geostatistical Units	Census Years								
	1941	1951*	1961	1966	1971	1976	1981	1986	1991
CDs	288	248	248	241	260	265	266	266	290
CSDs	5,354	4,981	4,470	4,480	5,096	5,546	5,710	6,009	6,006
CMAs	12	15	17	19	22	23	24	25	25
CAs	-	16**	20**	23**	90	88	88	114	115

* Newfoundland was included in the census of Canada for the first time in 1951, following union with Canada in 1949.

** In 1951 and 1961, CAs were called "Other Major Urban Areas". In 1966, they were called "Major Urban Areas".

3. Collection and Processing Changes

The various collection and processing procedures have already been described for the 1991 Census in Sections III through V. The changes over censuses associated with each of the stages in collection and processing and their impact on historical comparability are considered. In general, most of these changes have not significantly affected the comparability of mobility and migration data.

a. Collection

(1) Sampling

The main changes that took place in coverage and field collection over the 1941-76 period were the introduction of sampling in 1961 and self-enumeration in 1971. From 1961 on, mobility data were collected on a sample basis. Estimates of total standard error were provided in 1971 and 1976, and took into account the effects of sampling and response error, as well as processing error. From 1981 on, only estimates of sampling error have been produced. As noted earlier, the sample was 33 1/3% of households for the years 1971 and 1976, and 20% of households in 1961, 1981, 1986 and 1991.

(2) Field Processing

Generally, field edit and follow-up procedures are not applicable prior to 1971, since a canvasser (interviewer) approach rather than self-enumeration was used. From 1971 on, mobility has been one of the variables marked for mandatory follow-up during field edit procedures.

Rules for determining follow-up of mobility responses were similar in the 1976, 1981, 1986 and 1991 Censuses; the most significant change occurred between 1971 and 1976. From 1976 on, census representatives (CRs) were directed to follow up situations where the respondent checked "different city ..." but failed to provide a complete and legible write-in giving at least the name of the municipality and the province. However, this instruction was not implemented in 1971, and as a result there was a higher incidence of "province of residence not stated" than in 1976. As noted in Section III, field edit procedures improve response rates (by reducing non-response, partial and multiple response).

b. Data Assimilation

The processing of mobility data for the 1991 Census was somewhat different from that for 1986. For the 1986 Census, the write-ins on the place of residence 5 years ago were manually coded by coding clerks using seven-digit codes during regional office processing (ROP) and nothing else was done until the edit and imputation stage. For the 1991 Census, the texts of the write-ins were captured during ROP, and then an automated computer coding system was used to assign a seven-digit code to each write-in. Duplicated name places were computer-coded using the population distribution in 1986 among the places. For example, if there were two duplicate name places, one

with 70% of the population of the sum of the two places and the other 30%, then, as a part of head office processing (HOP), a seven-digit code was assigned to the randomly selected 70% of the cases with duplicate name places, and another code to the remaining cases.

In relation to the processing of mobility data from questionnaire responses into machine-readable information, the differences in ROP and HOP between the 1981 and 1986 Censuses are minimal, with limited impact on data comparability.

The revision of coding procedures between 1981 and 1986 involved the assignment of codes to duplicate name places (DNPs) when respondents failed to report the type of municipality for places that bear the same name (e.g., Kingston township vs. Kingston city, both in Ontario). In 1971, 1976 and 1981, "alternating" procedures were used in assigning codes between two or more CSDs (or other places). In 1976 and 1981, a "preferred" approach was also incorporated for some of the DNPs such that, where the population differential between the CSDs in question was large, only the CSD of the larger(est) population was coded. Duplicate name places which were to be coded through this approach were identified with an asterisk in the Place Name Code Book (PNCB). There were problems with the application of this procedure, such that coders were always assigning the code of the asterisked place, even when the CSD type was reported. In 1986, while both alternating and preferred approaches were retained, procedures were revised and the assignment of asterisks was based on a thorough review of DNPs and their population differences and ratios. However, there are indications that in 1986 the application of coding procedures during ROP still had problems (see Section VI).

For a review of data assimilation operations prior to 1981, please refer to the 1976 guide.

c. Edit and Imputation

Edit and Imputation Due to the introduction of a filter question and the question on the name of the country of origin in the 1991 Census, the number of modules for edit and imputation has increased significantly. However, these changes do not have any significant impact on historical comparability.

Edit and imputation (E&I) procedures were almost identical in the 1981 and 1986 Censuses. The minor differences involved imputation based on a "donor" record. In 1981, the variables used to find a donor with a similar set of characteristics were age, sex, mother tongue and marital status; in 1986 the variable "aboriginal residence (on/off reserve)" was added as an additional characteristic. As well, the geographic search area for donors was narrowed down from the province area in 1981 to the census division level in 1986.

In terms of processing, the most significant change in E&I occurred in 1981. Prior to 1981, non-response (partial/total) to the question on previous place of residence was reported as "not stated". However, for 1981, this "not stated" category was dropped. Non-response to the question on previous place of residence was changed to a specific response via a combination of deterministic, family and hot-deck imputation assignments. This imputation was achieved using the SPIDER program, which was introduced in 1981.

In principle, the 1981 E&I strategy was similar to that of 1976, with the exception of the imputation of data for the "not stated" response category. Details on E&I procedures for 1976, along with a comparison of E&I procedures from 1941 to 1976 and an assessment of their impact on mobility data, can be found in the 1976 User's Guide.

d. Comparability of Variables Available for Retrieval

In 1991, 13 variables were created for retrieval. In addition to the 12 variables which were available since 1976, the variable CO5 was added. This variable provides the information on the number of persons who lived outside Canada five years ago, by country of origin.

The 12 variables available for retrieval in 1986 were also available in 1976 and 1981. While there are no changes in variables between 1981 and 1986, three of the twelve variables, POP5, RUUB5 and CMA5, underwent changes in concept/derivation between 1976 and 1981.

- The variable POP5 is currently based on the population size of the census subdivision (CSD) of residence five years earlier, whereas in 1976 the values of POP5 were based on the CMA/CA size if the CSD was located within a CMA or CA (Puderer, 1980, p. 72).
- In 1976, the variable RUUB5 was derived only for internal migrants. From 1981 on, the derivation included all non-movers and non-migrants in addition to internal migrants.
- In 1976, not all CA boundaries were consistent with the boundaries of their component CSD, thereby affecting the derivation of CMA5/CA5. The approach used for the assignment of the CA of residence 5 years ago when the reported CSD of residence was "partially in", and "partially out", of the CA was similar to that for derivation of rural/urban place of residence. Migrants would be included in, or excluded from, the CA in question relative to the proportion of the CSD's 1976 population in and out of the CA (Puderer, 1980, pp. 70-71).

In 1971, as in 1976, the same set of post-E&I variables were derived, although some changes related to geostatistical areas occurred between the two censuses. Differences in processing concepts prior to 1976 that affect these variables are discussed in detail in the 1976 User's Guide on Mobility. The effects of processing changes over the 1941-1976 Censuses can be summarized as follows:

- Comparison of rural/urban (rural farm, rural non-farm) migration between two or more censuses is not advised.
- Caution is recommended when analyzing rural/urban migration for the periods 1956-1961, 1966-1971 and 1971-1976 since the methods used to derive previous rural/urban status changed in the period between the 1961 and 1976 Censuses.
- Notwithstanding boundary and definitional changes to the geostatistical areas (i.e., CMAs/CAs) the origin-destination data as provided by the relevant censuses have not been seriously affected by processing changes.

From the mobility 1-year interval data, the four variables MOB1, PR1, PR and CO1 (see Appendix B for description) were created for the first time in the 1991 Census, because the question on the place of residence 1 year ago was asked for the first time in this census.

VIII. Products and Services

A. Consultation on User Needs

Greater emphasis was placed on user consultation for the 1991 Census products and services. Over the course of two years, over 3,000 organizations from the private and public sectors were approached to solicit their comments on the proposed product and service line.

The primary objective of the project was to consult with current and potential census data users to evaluate the proposed 1991 product and service line. Client feedback obtained in this way was used to assist census personnel in assessing and determining product features, content, prices, etc.

Consultations varied considerably in format and in terms of numbers and client sectors consulted. For example, some smaller consultations, restricted to regional reference centres and provincial focal points, tended to be preliminary investigations of newly-developed product types. At the other end of the scale, the Dimensions Series was the subject of a mail survey of 2,500 users and potential users, as well as cross-country focus group discussions. Another mail survey of more than 200 libraries yielded an 80% response rate and provided valuable insights into concerns librarians had with regard to census products. Most other products were presented for consultation to several dozen users from a variety of sectors, either by means of face-to-face interviews or mail-back questionnaires. In many cases, the Regional Reference Centre staff was heavily involved in the organizing of the consultations, conducting the interviews and providing their own feedback.

Between November 1 and November 15, 1990, eight (8) Focus Groups on Census Data Support Information were surveyed for their comments and recommendations regarding the *1991 Census Technical Report Series*. Suggested fundamental changes and improvements to the product helped meet the needs of current and potential users.

B. Product Content Determination

While users overwhelmingly endorsed most products and services presented to them, they also provided valuable critiques. Many of the suggestions confirmed the need for changes already planned. In some cases, this feedback provided evidence that there was less demand for a product and therefore no need for its production. Findings from the Task Force on the Census Custom Products Service resulted in a complete restructuring of client-related operations, in order to provide better and more timely service. Consultation on the place of work variable was carried out to determine the interest in and level of funding available for coding to the submunicipal level.

Consultation proved to be an essential exercise in developing the shape and content of the census product and service line, and determining market potential and pricing. Furthermore, the public relations aspect cannot be underestimated: consultation enabled members of the public to preview census output and provided assurance that their input makes a difference.

C. Marketing of Products and Services

The 1991 Census Marketing Program ensures that potential data users receive the information they need on census products and services in order to make informed decisions. It seeks to reach those individuals or enterprises that rely on census data to inform them of the products and services available from the census database and their potential uses and applications. The national headquarters in Ottawa and the regional reference centres across the country work in partnership to ensure that the largest number of people possible are aware of what the census database has to offer.

The Census Marketing Program assumes these tasks by:

- planning and coordinating census data releases and publication releases;
- developing a client-oriented approach to the promotion of the census database;

- maintaining relations with sponsors who provided support prior to June 4, 1991;
- sustaining relations with purchasers of 1986 Census data and of similar Statistics Canada products and services;
- providing sales support and training workshops to present users and potential new users of census data;
- integrating the products and services generated by the census with many other products and services available from Statistics Canada.

For each data release, the Census Marketing Program, ensures that the information relative to the release is available to the general public through many outlets, especially the media. Communications with other government departments is achieved through letters to deputy ministers indicating release highlights as well as through briefing sessions and special lecture presentations. In addition, *The Daily* is sent to every Member of Parliament and Senator informing each of the results of every data release. For the first time, in conjunction with census data releases, classroom activities are made available to teachers across the country. This promotes awareness of the availability and uses of census data and other products and services provided by Statistics Canada. Ten official data releases are scheduled for the period of April 1992 to April 1993.

IX. Conclusion

This Technical Report has provided information on a number of topics concerning 1991 Census of Canada data on mobility and migration. An assessment of the historical comparability of these data from the 1961 Census through to the 1991 Census has also been included. In the case of data quality, the user is reminded that analysis of migration data at the CSD level should be done with caution.

Appendices



Appendix A

Mobility Questions and Guide Instructions 1961 to 1991

1961 Census Questionnaire - Mobility Question

This form is required for all persons 15 years of age and over in this household

Office use only

Questions 1-5 to be completed by the Enumerator (as applicable)

1. Did you live in this dwelling 5 years ago, on June 1, 1956?	Same dwelling <input type="checkbox"/> 0	Same city, town, etc., (not same home) <input type="checkbox"/> 1	Outside of Canada <input type="checkbox"/> 2	Different city, town, village, etc., in Canada <input type="checkbox"/> 3						
Omit Questions 2 and 3										
2. In what city, town, village or municipality did you live?	(Name of city, town, village, municipality, etc.)		(Province or territory)							
Important: If outside a city or town limit, specify name of suburban municipality, and not that of city or town.										
3. Was this dwelling on a farm or small agricultural holding? (One acre and \$50 sales)	No <input type="checkbox"/> 0	Yes <input type="checkbox"/> 1	Office use:	<table border="1"> <tr> <td>Prov.</td> <td>Type</td> <td>M.A.</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	Prov.	Type	M.A.			
Prov.	Type	M.A.								
Questions 4 and 5 for all married, widowed and divorced women										
4. What was the date of your (first) marriage?	Year	Jan.-May <input type="checkbox"/> 0	June-Nov. <input type="checkbox"/> 1	Dec. <input type="checkbox"/> 2						
5. How many live-born children have you had? or None <input type="checkbox"/>									

1971-Census Questionnaire - Mobility Question

26. Where did you live 5 years ago, on June 1, 1966 ?

- ☐ Same dwelling → **SKIP TO QUESTION 28**
- ☐ Same city, town, village or municipality
(not same dwelling)
- ☐ Outside of Canada
- ☐ Different city, town, village or municipality in Canada,
give its name →

City, town, village, municipality, etc.

County

Province

IMPORTANT: *If outside city or town limit, specify name of
suburban municipality and not of city or town.*

27. How many times have you **MOVED** from one Canadian city, town, village or municipality to another since June 1, 1966 ?

Count moving away and returning to the same place as 2 moves.

- | | | |
|----------------------------|-------------------------|---------------------------------|
| <input type="radio"/> None | <input type="radio"/> 2 | <input type="radio"/> 4 |
| <input type="radio"/> 1 | <input type="radio"/> 3 | <input type="radio"/> 5 or more |

1971-Instruction Booklet - Guidelines for Mobility Question

- 26
- Be sure to fill one and *only* one of the four circles
 - If you have filled the bottom circle, be sure to enter the *name* of your locality of residence 5 years ago and the county and province in which it is located. Where a name is used both for a parish and a town, etc., please indicate which is correct by adding the type, i.e. Granby *town* or Granby *parish*. If you were living in a suburban municipality, enter its name rather than the name of the large metropolitan area of which it forms a part, e.g., East Kildonan rather than Winnipeg.
 - We want to measure *actual* movements of population within Canada, not changes in address due *only* to municipality boundary changes (or name changes). Therefore, consider your residence 5 years ago in terms of *present* municipality boundaries.
- 27
- If you came to this country from abroad, *do not include* your arrival in Canada as a "move", but count each later move within Canada since June 1, 1966.
 - *Students* who have left their home base temporarily to attend university or to take summer employment should *not* count these as moves.

1976-Census Questionnaire - Mobility Question

12.

Where did you live 5 years
ago, on June 1, 1971?

- ☐ Same dwelling
- ☐ Different dwelling in same city,
town, village or municipality
- ☐ Outside Canada
- ☐ Different city, town, village or
municipality in Canada. Print
its name below.

City, town, village, municipality, etc.

County

Province

*Important: If outside city or town limits,
specify name of suburban municipality
and not main city or town.*

1976-Instruction Booklet - Guidelines for Mobility Question

12 Fill one and only one of the four circles.

If you have filled the bottom circle, be sure to enter the name of your locality of residence 5 years ago, and the county (or regional municipality, regional district, etc.) and province in which it was located. Where a name is used for both a town and a parish, e.g. Bathurst *town* and Bathurst *parish*; or a town or city and a township, e.g. Kingston *city* and Kingston *township*; please indicate which is correct by adding the type. If you were living in a municipality which is part of a large metropolitan area, enter its name rather than the name of the large metropolitan area, e.g. North Vancouver rather than Vancouver; Scarborough rather than Toronto; Laval rather than Montreal; Sainte-Foy rather than Quebec.



We want to measure actual movements of population within Canada, not changes in address due only to municipal boundary or name changes. Therefore, consider your residence 5 years ago in terms of its *present* municipal boundaries.

1981-Census Questionnaire - Mobility Question

36. Where did you live 5 years ago on June 1, 1976?

Mark one box only

NOTE: If your place of residence 5 years ago was a municipality within a large urban area, be careful not to confuse suburban municipalities with the largest city. For example, distinguish between Montréal-Nord and Montréal, Scarborough and Toronto, West Vancouver and Vancouver.

- 04 ☐ This dwelling
- 05 ☐ Different dwelling in this city, town, village, borough, or municipality  Go to Question 37
- 06 ☐ Outside Canada
- 07 ☐ Different city, town, village, borough, or municipality in Canada (specify below) 

City, town, village, borough, or municipality

County Province or territory

08 ☐ ☐ ☐

1981-Census Guide - Guidelines for Mobility Question

Question 36

Give the information for your usual residence 5 years ago even if you were away temporarily on June 1, 1976.

Mark only one of the four boxes.

If you marked "Different city, town, village, borough, or municipality in Canada", be sure to enter the name of your locality of residence 5 years ago, and the county (or regional municipality, regional district etc.) and province or territory in which it is located. If the same name is used for both a city or town and a parish, township or other municipality in the county of your residence five years ago, indicate which is correct by specifying type (e.g. St. Andrews *town* or St. Andrews *parish*; Granby *city* or Granby *municipality*; Kingston *city* or Kingston *township*).

1986-Census Questionnaire - Mobility Question

24. Where did you live 5 years ago, that is, on June 1, 1981?*Mark one box only***NOTE:** If your place of residence 5 years ago was a municipality within a large urban area, be careful not to confuse suburban municipalities with the largest city. For example, distinguish between Montréal-Nord and Montréal, Scarborough and Toronto, West Vancouver and Vancouver.

- 16 ☐ This dwelling
- 17 ☐ Different dwelling in this city, town, village, township, municipality or Indian reserve
- 18 ☐ Outside Canada
- 19 ☐ Different city, town, village, township, other municipality or Indian reserve in Canada (specify below)

Go to Question 25

City, town, village, township, other municipality or Indian reserve

County

Province or territory

20



1986-Census Guide - Guidelines for Mobility Question

Question 24

Give the information for your usual residence 5 years ago even if you were away temporarily on June 1, 1981.

Mark only one of the four boxes.

If you marked "Different city, town, village, township, other municipality or Indian reserve in Canada", be sure to enter the name of your locality of residence 5 years ago, and the county (or regional municipality, regional district, etc.) and province or territory in which it is located. If you lived in an area where the same name is used for both a city, town or village, and a parish, township or other municipality, indicate which is correct by specifying the type (e.g., St. Andrews town or St. Andrews parish; Granby city or Granby municipality, Kingston city or Kingston township).

The internal migration information obtained from this question is needed to prepare accurate estimates and projections of national and provincial populations. Population estimates are used as a basis for distributing funds between the federal government and the provinces. Population projections are required for planning by both government and business, for example, in determining future needs for housing, education and social services.

1991-Census Questionnaire - Mobility Question

MOBILITY

20. Where did this person live **1 year ago**, that is, on June 4, 1990?

Mark one circle only.

☐ 12 Lived at the same address as now

☐ 13 Lived in the same province/territory, but at a different address

☐ 14 Lived in a different province/territory in Canada
Print name of province/territory.

15

☐ 16 Lived outside Canada
Print name of country.

17

☐ 12 Lived at the same address as now

☐ 13 Lived in the same province/territory, but at a different address

☐ 14 Lived in a different province/territory in Canada
Print name of province/territory.

15

☐ 16 Lived outside Canada
Print name of country.

17

21. Did this person live at this present address **5 years ago**, that is, on June 4, 1986?

25.

☐ 01 Yes, lived at the same address as now
Go to Question 23

☐ 02 No, lived at a different address

☐ 03 Lived in the same city, town, village, township, municipality or Indian reserve

OR

☐ 04 Lived in a different city, town, village, township, municipality or Indian reserve in Canada
Print below.

City, town, village, township, municipality or Indian reserve

05

County (if known)

Province/territory

OR

☐ 06 Lived outside Canada
Print name of country.

07

26.

☐ 01 Yes, lived at the same address as now
Go to Question 23

☐ 02 No, lived at a different address

☐ 03 Lived in the same city, town, village, township, municipality or Indian reserve

OR

☐ 04 Lived in a different city, town, village, township, municipality or Indian reserve in Canada
Print below.

City, town, village, township, municipality or Indian reserve

05

County (if known)

Province/territory

OR

☐ 06 Lived outside Canada
Print name of country.

07

22. Where did this person live **5 years ago**, that is, on June 4, 1986?

Some large cities are made up of smaller cities or towns called municipalities. Where applicable, distinguish between the municipality and the large city, such as Anjou and Montréal, Scarborough and Toronto, Burnaby and Vancouver, Saanich and Victoria.

Mark one circle only.

1991-Census Guide - Guidelines for Mobility Question

Mobility

We ask Questions 20 to 22 to get a picture of where Canadians are moving to and from, and who is moving in terms of age, sex, education, occupation, etc. This information is important to all levels of government, to municipal planners, as well as to various private sector businesses. It is used in determining future needs for such things as housing, education and social services.

In these three questions, the term "address" refers to the address of residence, not the mailing address (P.O. Box, etc.). Please be sure to base all answers on the address of residence.

**Question 20: MOBILITY - PLACE OF RESIDENCE
ONE YEAR AGO**

Mark only one of the four circles provided to indicate each person's usual place of residence one year ago (on June 4, 1990), even if the person was not at home on that date.

For persons who lived at the same residence on that date, mark **Lived at the same address as now**. For persons who lived at a different residence but within the same province or territory, mark **Lived in the same province/territory, but at a different address**. For persons who lived in a different province or territory in Canada on that date, mark that circle and print the name of the province or territory in the box provided.

For persons whose usual residence was outside Canada on that date, mark that circle and enter the name of the country according to present boundaries.

**Question 21: MOBILITY - SAME OR DIFFERENT
ADDRESS FIVE YEARS AGO**

Mark only one of the two circles provided to indicate each person's usual residence five years ago, even if the person was away temporarily on June 4, 1986.

For persons who currently live at the same address of residence as they did five years ago (on June 4, 1986), mark **Yes, lived at the same address as now** and skip to Question 23. For persons who do not live at the same address of residence now as they did five years ago, mark **No, lived at a different address** and go to Question 22.

**Question 22: MOBILITY - PLACE OF RESIDENCE
FIVE YEARS AGO**

Only answer this question for persons who do not currently live at the same address of residence as they did five years ago. Mark only one of the three circles provided.

For persons who lived at a different address of residence five years ago in the same city, town, village, township, municipality or Indian reserve, mark that circle and go to Question 23.

For persons who lived in a different city, town, village, township, municipality or Indian reserve, mark that circle and print the name of the place in which they lived five years ago in the boxes provided. Enter the name of the city, town, village, etc.; county, regional municipality or district; and province or territory. For persons who lived in an area where the same name was used for both the city, town or village as for the parish, township or municipality, indicate which is correct by specifying the type (for example, St. Andrew's town or St. Andrew's parish; Granby city or Granby municipality; or Kingston city or Kingston township).

For persons who lived outside Canada five years ago, mark that circle and enter the name of the country in which they lived according to present boundaries.

Appendix B

1991 Mobility Variables for Retrieval

Fourteen Mobility Variables Available for Retrieval, 1991 Census

Five-year Interval Data

1. **MOB5: MOBILITY STATUS - PLACE OF RESIDENCE 5 YEARS AGO**

Refers to the relationship between a person's usual place of residence on Census Day and his/her usual place of residence five years earlier. On the basis of this relationship, the population is classified as **non-movers** and **movers** (mobility status). Within the category **movers**, a further distinction is made between **non-migrants** and **migrants** (migration status).

2. **PR5: PROVINCE OF RESIDENCE 5 YEARS AGO¹**

Refers to the person's usual province or territory of residence on June 1, 1986, five years prior to Census Day.

3. **PR: CURRENT PROVINCE OF RESIDENCE¹**

Refers to the person's usual province or territory of residence on Census Day, June 4, 1991.

4. **PCD5: CENSUS DIVISION OF RESIDENCE 5 YEARS AGO¹**

Refers to the person's usual census division of residence on June 4, 1986, five years prior to Census Day. For a definition of the census division, refer to Appendix C.

1 Three types of geographic areas are systematically identified by codes of the Standard Geographic Classification (SGC), whether current place of residence or origin of migrants. These are:

- (a) provinces and territories (PR, PR5);
- (b) census divisions (PCD, PCD5);
- (c) census subdivisions (PCSD, PCSD5).

These areas are hierarchically related. PCSDs and PCSD5s aggregate to PCDs and PCD5s, which in turn aggregate to a province or territory, PR and PR5. This relationship is reflected in the seven-digit SGC code as follows:

PR	CD	CSD	
SGC	XX	XX	XXX
PR, PR5	XX		
PCD, PCD5	XX	XX	
PCSD, PCSD5	XX	XX	XXX

(X = one digit)

5. **PCD: CURRENT CENSUS DIVISION OF RESIDENCE¹**

Refers to the person's usual CD of residence on Census Day, June 4, 1991.

6. **PCSD5: CENSUS SUBDIVISION OF RESIDENCE 5 YEARS AGO¹**

Refers to the person's usual municipality (CSD) of residence on June 4, 1986, five years prior to Census Day. For a definition of the CSD, refer to Appendix C.

7. **PCSD: CURRENT CENSUS SUBDIVISION OF RESIDENCE¹**

Refers to the person's usual CSD of residence on Census Day, June 4, 1991.

8. **CMA5: CENSUS METROPOLITAN AREA OR CENSUS AGGLOMERATION OF RESIDENCE 5 YEARS AGO**

Refers to the CMA or CA in which a person usually resided on June 4, 1986, five years prior to Census Day. For a definition of the CMA or CA, refer to Appendix C.

9. **CMA: CURRENT CENSUS METROPOLITAN AREA OR CENSUS AGGLOMERATION OF RESIDENCE**

Refers to the person's usual residence on Census Day, June 4, 1991.

10. **POP5: POPULATION SIZE GROUP OF RESIDENCE 5 YEARS AGO**

Refers to the population size of the census subdivision where the person usually resided on June 4, 1986, five years prior to Census Day. The size of the census subdivision is based on the 1991 population.

11. **POP: POPULATION SIZE GROUP OF CURRENT PLACE OF RESIDENCE**

Refers to the population size group of the census subdivision where the person currently resides (on June 4, 1991).

12. **RUB5: RURAL-URBAN PLACE OF RESIDENCE 5 YEARS AGO**

Refers to the rural or urban classification of the census subdivision where the person usually resided on June 4, 1986, five years prior to Census Day. For part urban, part rural CSDs, Rural-Urban Place of Residence 5 Years Ago was assigned relative to the 1991 urban-to-rural population distribution for that CSD.

13. **CO5: COUNTRY OF RESIDENCE 5 YEARS AGO**

Refers to the country of origin, i.e., country of residence five years prior to Census Day, according to the present boundary.

14. **CSDTYPES: CENSUS SUBDIVISION TYPE OF RESIDENCE 5 YEARS AGO**

Refers to the census subdivision (CSD) type classification of the CSD (Indian reserve, village, town, township, city or municipality) where the person usually resided on June 4, 1986, five years prior to Census Day. This concept applies to the Mobility Status (5 Years Ago) subuniverse only.

Four Mobility Variables Available for Retrieval, 1991 Census

One-year Interval Data

1. **MOB1: MOBILITY STATUS - PLACE OF RESIDENCE 1 YEAR AGO**

Refers to the relationship between a person's usual place of residence on Census Day and his/her usual place of residence one year earlier. On the basis of this relationship, the population is classified as **non-movers** and **movers** (mobility status). Within the category **movers**, a further distinction is made between **intraprovincial movers**, **interprovincial migrants**, and **external migrants**.

2. **PR1: PROVINCE OF RESIDENCE 1 YEAR AGO**

Refers to the person's usual province or territory of residence on June 4, 1990, one year prior to Census Day.

3. **PR: CURRENT PROVINCE OF RESIDENCE**

Refers to the person's usual province or territory of residence on Census Day, June 4, 1991.

4. **CO1: COUNTRY OF RESIDENCE 1 YEAR AGO**

Refers to the country of origin, i.e., the country of residence one year prior to Census Day, according to the present boundary.



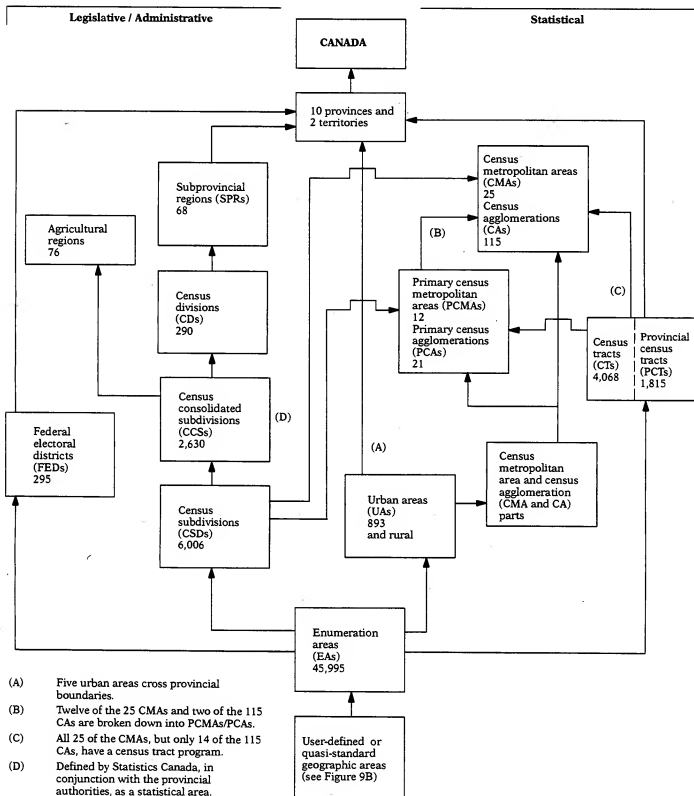
Appendix C

1991 Census Geographic Hierarchy and Definitions

Reproduced from the *1991 Census Handbook*,
Statistics Canada, Cat. No. 92-305E.



Hierarchy of Standard Geographic Areas



0. Overview of the Standard Geographic Areas

The following standard geographic areas are used in the dissemination of census data:

Geographic area	Total number
Enumeration areas (EAs)	45,995
Census tracts (CTs)	4,068
Provincial census tracts (PCTs)	1,815
Urban areas/rural areas	893
CMA/CA parts	N/A
Primary census metropolitan areas (PCMAS)	12
and primary census agglomerations (PCAs)	21
Census metropolitan areas (CMAs)	25
and census agglomerations (CAs)	115
Federal electoral districts (FEDs)	295
Census subdivisions (CSDs)	6,006
Census consolidated subdivisions (CCSs)	2,630
Census divisions (CDs)	290
Agricultural regions	76
Subprovincial regions (SPRs)	68
Provinces/territories	12

This section looks briefly at each type of area. The appropriate links are shown in Figure 9A.

Definitions, historical boundary changes and descriptions of available maps are covered more thoroughly in the other census reference products, including the *1991 Census Dictionary* (Catalogue No. 92-301 E or D), the *1991 Census Catalogue* (Catalogue No. 92-302 E) and the *1991 Census Geography: A Historical Comparison* (Catalogue No. 93-311 E).

1. Enumeration area (EA)

An enumeration area is the area canvassed by one census representative. It is the basic building block of all standard geographic areas. EAs are defined by the number of households they contain and by physical boundaries such as bodies of water and streets. An EA never cuts across any boundary recognized by the census. The enumeration area is normally the smallest geographical unit for which census data are available. Therefore, it is defined in accordance with the following criteria:

- (a) Dwellings: the number of dwellings in an EA may vary from 375 (maximum) in large urban areas to 125 (minimum) in rural areas.
- (b) Limits: since the EA is the basic unit for all geographic areas, it must never overlap an area recognized by the census (federal electoral districts, census divisions, census subdivisions, census tracts, etc.) Moreover, the borders are defined in such a way that the Census Representative can locate them without difficulty (for example, using streets, roads, railways and rivers).

The EAs are primarily census collection units; they are not designed as dissemination areas. For reasons of confidentiality, only some information is available.

2. Census tract (CT)

A census tract is a small census geographic area established in a large urban community with the assistance of local specialists who help define boundaries that are useful for urban and social research. These boundaries are rarely altered; however, they do change when census subdivision (CSD) boundaries change or when CT splits occur in areas of rapid growth. In cases where CTs are split, both parts are labelled with a numerical identifier to allow for comparative studies between identical CT boundaries of previous censuses. Populations of CTs vary between 2,500 and 8,000 persons, with an average of about 4,000. For the 1991 Census, 39 census metropolitan areas (CMAs) and census agglomerations (CAs) have census tracts.

All CMAs and CAs containing a CSD with a population of 50,000 or more at the previous census are eligible for a census tract program. For example, the central area of the Sherbrooke CMA is divided into CTs. Once an urban centre is added to the program, it is retained even if its population subsequently declines.

An example of the kind of social research done using census tract boundaries is "Changes in Mortality by Income in Urban Canada from 1971 to 1986". The findings of this study were a joint effort undertaken by the Policy, Planning and Information Branch, Health and Welfare Canada, and the Canadian Centre for Health Information, Statistics Canada. In this study, postal codes were matched to census data for particular census tracts by using the Postal Code Conversion File (PCCF). The purpose of such a study is to enable communities to analyse community health, prepare plans for the future and monitor and evaluate local health programs.

3. Provincial census tract (PCT)

A provincial census tract is a permanent small rural or urban census geographic area. It exists in areas not covered by the census tract program. Populations of PCTs vary between 3,000 and 8,000 persons, with an average of about 5,000. As much as possible, their limits follow permanent physical features or geographic boundaries suggested by authorities of the provinces and territories.

4. Urban area/rural area

An urban area is a continuously built-up area with a population of 1,000 or more and a population density of at least 400 persons per square kilometre based on the previous census. To be considered continuous, the built-up area must not have a discontinuity exceeding two kilometres. A rural area is defined as any area that does not meet the requirements for an urban area.

5. CMA/CA parts

CMA/CA parts are the rural and urban areas within a census metropolitan area (CMA) or a census agglomeration (CA). There are three CMA/CA parts:

- (a) urbanized core: a large urban area around which a CMA or CA is delineated;
- (b) urban fringe: an urban area within a CMA or CA, but outside of the urbanized core;
- (c) rural fringe: all territory within a CMA or CA lying outside of urban areas.

Every CMA, CA, PCMA and PCA has an urbanized core, but may or may not have urban or rural fringe areas. The total urbanized core of a consolidated CMA or CA is the sum of the constituent cores. Similarly, the totals for urban and rural fringes of a consolidated CMA or CA are the sums of the constituent fringes.

6. Primary census metropolitan area (PCMA) and primary census agglomeration (PCA)

In some regions, a neighbouring census metropolitan area (CMA) and census agglomeration (CA) are sometimes economically and socially linked. In this case, they are grouped together to form a single CMA and CA (consolidated).

This consolidated CMA is divided into a primary census metropolitan area (PCMA) and one or more primary census agglomerations (PCAs). Thus, a PCMA or a PCA is a labour market subregion within the larger consolidated CMA or CA. All PCMAs or PCAs, like regular CMAs and CAs, contain one or more census subdivisions.

7. Census metropolitan area (CMA) and census agglomeration (CA)

Urban structure and economic links between cities are such that, in many cases, the data dealing with a particular city (a census subdivision) do not take into account that city's true area of influence. This, for example, is what happens in the case of the cities of Toronto, Ottawa-Hull, Montréal, Québec, Chicoutimi and Windsor, where bedroom communities play a vital economic role with respect to the census subdivision (CSD). A CMA is an urbanized core of at least 100,000 population (based on the previous census), together with its main labour market area.

A CA is the main labour market area of an urbanized core with a population of at least 10,000 based on the previous census. The 1991 Census recognizes 25 CMAs and 115 CAs (see Figure 10A).

Once a CA attains an urbanized core population of 100,000, it becomes a CMA and continues to be one even if its population subsequently declines below 100,000. However, if the population of a CA in an urbanized core drops below 10,000, the CA is removed from the CA program.

The 1991 CMAs and CAs were delineated using data derived from the place of work and place of residence questions in the 1981 Census (see Section 5 of this chapter for a description of these two questions). For a census subdivision (CSD) to be included in a CMA, at least one of the following criteria must be satisfied:

- the CSD falls completely or partly inside the urbanized core;
- at least 50% of the employed labour force living in the CSD works in the urbanized core;
- at least 25% of the employed labour force working in the CSD lives in the urbanized core;
- if a CSD meets the criteria for inclusion, but is not contiguous to a CMA, the place of work commuting flow data are aggregated for all CSDs within the census consolidated subdivision (CCS) - inclusion or exclusion of the entire CCS within a CMA is then determined;
- if the commuting flow is less than 100 persons, CSDs are excluded from the CMA, even if the second or third criteria apply;
- even if the second, third, fourth or fifth criteria apply, CSDs may be included or excluded to maintain the contiguity of the CMA.

Adjacent CMAs and CAs which are socially and economically integrated are grouped to form a single consolidated CMA or CA. Regular CMAs and CAs, on the other hand, are independent. For such areas to be eligible for consolidation, the total commuting interchange between the particular CMAs and CAs must be equal to at least 35% of the labour force living in the smaller CMA or CA. If consolidation takes place, the original CMAs or CAs become subregions (called primary CMAs or CAs) within the consolidated CMA or CA.

The implications for residents occupying areas subject to consolidation could include, for instance, additional taxes to support metropolitan services. Increased taxes in support of city public transportation systems is an example of the possible effects of consolidation. On the other hand, the residents of such areas could be eligible to apply for special programs and benefits.

8. Federal electoral district (FED)

Federal electoral districts are established by the Parliament of Canada. Each FED is represented by a member in the House of Commons. When the electoral map is revised, Statistics Canada readjusts the data so that they correspond to the new district boundaries. There are 295 FEDs in Canada according to the 1987 Representation Order.

FEDs are defined according to the following criteria:

- the legal limits and descriptions are the responsibility of the Chief Electoral Officer and are published in the Canada Gazette;
- FED limits are usually revised every 10 years after the results of the decennial census.

9. Census subdivision (CSD)

Census subdivisions are municipalities, Indian reserves, Indian settlements and unorganized territories. Unorganized territories usually cover remote regions, where there are no legally defined municipalities covering the entire territory. Every city, town and village, for example, is a census subdivision. There are 6,006 census subdivisions in Canada. In Newfoundland, Nova Scotia and British Columbia, CSDs can also be geographic areas created by Statistics Canada, in co-operation with the provinces, as equivalents for municipalities.

10. Census consolidated subdivision (CCS)

The concept of a CCS is a grouping of small **census subdivisions** within a containing census subdivision (CSD), created for the convenience and ease of geographic referencing. CCSs are used primarily in the dissemination of the census of agriculture data. They may have changed since the last census if the component CSDs have changed. For 1991, several CCSs have been modified in the province of Quebec following the implementation of the new census division structure in that province.

Census consolidated subdivisions are delineated according to these rules:

- all CSDs smaller than 25 square kilometres are grouped with a larger CSD;
- a CSD larger than 25 square kilometres forms a CCS of its own unless it is surrounded on more than half its perimeter by another CSD; then it is included as part of the CCS formed by the other CSD;
- a CSD with a population greater than 100,000 persons forms a CCS on its own if it is surrounded by rural CSDs;
- the CCS name usually coincides with its largest CSD components in terms of land area.

11. Census division (CD)

"Census division" is the general term used for counties, regional districts, regional municipalities and five other types of geographic areas made up of groups of census subdivisions. There are 290 CDs in Canada.

There has been a complete restructuring of census divisions in Quebec between 1986 and 1991. CDs in Quebec will now respect the same legal limits as the "municipalités régionales de comtés (MRCs) or their equivalents (e.g., "communautés urbaines" and "territoires conventionnés"). The implementation of MRCs (or their equivalents) has led to an increase in the number of CDs in Quebec, from 76 in 1986 to 99 in 1991.

In Ontario, the CDs correspond to the counties, districts, district municipalities, metropolitan municipalities, regional municipalities and united counties.

Before we had postal codes, counties were used for identification purposes when sending the mail. They have been retained for the census so that data obtained over the years may be compared.

12. Agricultural region

An agricultural region is a subprovincial geographic region used by the census of agriculture in the dissemination of agricultural statistics. In all provinces except Prince Edward Island and Saskatchewan, an agricultural region is a contiguous group of census divisions. In Saskatchewan, agricultural regions are groupings of the census consolidated subdivisions, but these groupings do not necessarily respect census division boundaries. For Prince Edward Island, Yukon and the Northwest Territories, agricultural regions have not been defined.

13. Subprovincial region (SPR)

A subprovincial region refers to a geographical unit smaller than a province (with the exception of P.E.I. and the territories) made up of groupings of census divisions. The SPRs were created in response to the requirement for a geographical unit suitable for the analysis of regional economic activity. Such a unit is small enough to permit regional analysis, yet large enough to include a sufficient number of respondents such that, after confidential data are suppressed, a broad range of statistics can be released.

14. Province/territory

The ten provinces and the two territories are the major political units of Canada. They are also the basic geographical units for tabulating and cross-classifying census data.

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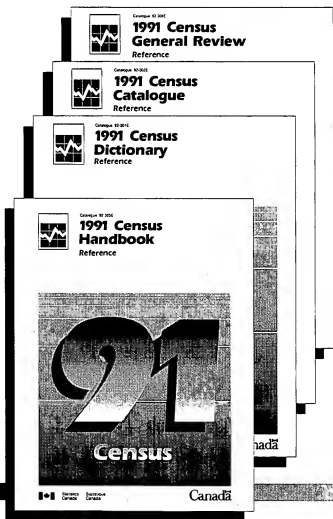
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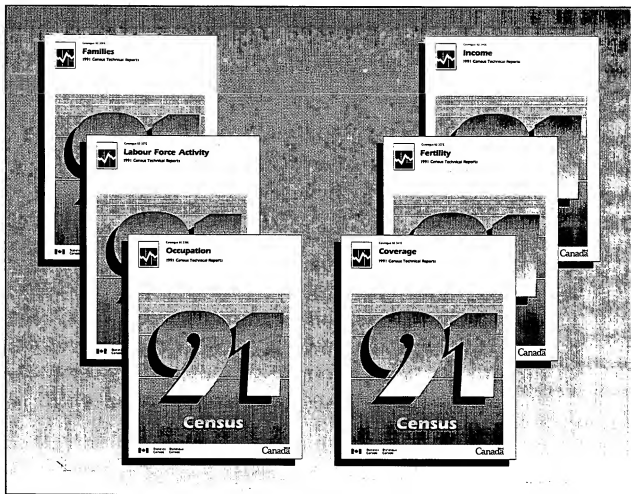
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